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PRINCIPLES
OF
ANATOMY
AND
PHYSIOLOGY.

BY

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FOR THE USE OF STUDENTS.

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ERRATA

ERRATA.

Page 18. line 2. for vertebra read vertebræ. P. 35. l. 22. dele at. P. 37. l. 3. for laſt read former. P. 50. l. 7. for lymphatic read lymphatics. P. 53. l. 21. after cavernous add ſubſtance. P. 53. l. 22. for ſuperior read poſterior. P. 54. l. 6. for ſubſtances read bodies. P. 77. l. 2. for veſſels read veſicles. P. 80. l. 6. for are read is. P. 85. l. 10. for ſecloris read ſclerotis. P. 101. l. 8. for faucicum read faucium. P. 120. l. 3. after life add it. P. 127. l. 1. for an active matter, read or an active matter. P. 140. l. 14. for vis aetrgo read vis a tergo. P. 168. l. 2. from the bottom, for mortique read morteque.

PRINCIPLES OF ANATOMY.

NEUROLOGY.

IT has already been noticed, that the nervous ſyſtem conſiſts of

1 Senſorium commune,
2 Spinal marrow,
3 Nerves.

Senſorium Commune.

The ſenſorium commune entirely occupies the cavity of the ſkull.

This important organ, and all its propagations, are covered by two membranes,

1 Dura mater,
2 Pia mater.

Dura Mater.

The dura mater is a denſe double membrane: its external ſurface adheres cloſely to the ſkull, eſpecially to its baſe; while its internal one, ſmooth and gliſtening, only touches the pia mater.

The external lamina that adheres to the ſkull by numerous ſmall veſſels, may be conſidered as the perioſteum of the inner table of the ſkull.

The internal lamina has proceſſes or duplicatures, by which its extent is encreaſed.

1 The falx that runs from the bottom of the frontal bone along its ſpine, and alſo along the ſagittal ſuture, and ſuperior portion of the vertebral ſpine of the occipital bone, and widens as it proceeds backwards. It thus forms a partial ſeptum in the courſe of the long axis of the head.

2 The ſeptum tranſverſum that lies in the courſe of the lateral ſpines of the occipital bone, and is of the ſame breadth with the ſuperior part of the falx that is connected to its upper and middle ſurface, and gives it the form of an arch, on which account it has been named tentorium.

3 Falx cerebelli, or little falx, that is extended along the inferior portion of the occipital ſpine, to the margin of the ſpinal hole.

Beſides theſe proceſſes, there are ſome others, leſs conſiderable, that might be enumerated.

This remarkable membrane contains the following venous cavities, named ſinuſſes, between its laminæ :

1 Superior longitudinal ſinus, running from before backwards, within the upper and convex edge of the falx.

2 Inferior longitudinal ſinus, like an ordinary vein, lying in the inferior margin of the falx.

3 Torcular Herophili, formed in the line of connection of the falx and ſeptum tranſverſum, running backwards.

4 The lateral ſinuſſes (one on each ſide) contained in the convex margin of the ſeptum tranſverſum, and are a bifurcation of the ſuperior longitudinal one. The torcular falls in with them at their beginning ; they ſweep towards the holes common to the occipital and temporal bones, and become internal jugular veins.

5 Cavernous ſinuſſes, ſituated one on each ſide of the ſella turcica.

Others of inferior note have been deſcribed.

The ſinuſſes are part of the venous ſyſtem ; for all the veins of the ſenſorium commune open into them in a ſlanting courſe, for the moſt part ; ſeemingly to prevent ſomewhat the regurgitation of the blood.

On the external ſurface, near the longitudinal ſinus, are ſituated glands, perhaps of the conglobate kind. The pits in the ſkull accommodate them. On the inſide, in the ſame direction, others are diſperſed. The adheſion to the ſkull and pia mater is always greateſt near them.

The anterior arteries are admitted through the orbitar fiſſures; the middle through the ſpinous holes of the ſphenoidal bones (all derived from the external carotids) and the poſterior come from the vertebrals. The veins terminate in the ſinuſſes.

As the ſuperior longitudinal ſinus may be wounded in trepanning, great caution is requiſite in performing this operation in its neighbourhood.

The ſurgeon ought not unneceſſarily to detach the dura mater from the ſkull, becauſe he lacerates the connecting veſſels.

When effuſion happens between the ſkull and dura mater, a perforation of the bone will be ſufficient to diſcharge it; but when it is within it, the membrane muſt be opened by careful inciſion.

Pia Mater.

This delicate membrane, which conſiſts of two laminæ, immediately inveſts the ſenſorium commune.

The external lamina, like that of the dura mater, called tunica arachnoidea, is ſimply extended over it; while the internal lamina, ſtrictly named pia mater, ſinks into every interſtice more or leſs profoundly.

Theſe laminæ are connected to one another by a delicate cellular ſubſtance, and in their interſtice ſupport innumerable arteries going to, and veins emerging from the ſenſorium.

It has no connection with the dura mater, except in the vicinity of the ſinuſſes, by means of veins that enter them.

The ſenſorium commune conſiſts of,

1 Cerebrum, or great brain.
2 Cerebellum, or little brain.
3 Medulla oblongata.

Cerebrum.

The cerebrum is uppermoſt, and by far the largeſt portion.

It is divided above by a ſciſſure in which the falx is lodged, into two portions, named hemiſpheres, which below have each three lobes, anterior, middle, and poſterior.

The anterior lobes lie in the anterior, the middle in the middle foſſæ of the baſe of the ſkull, and the poſterior on the tentorium.

The cerebrum is conſtantly diſtinguiſhable by a convoluted ſurface, reſembling the flexions of ſmall inteſtine, between which a duplicature of the inner lamina of the pia mater ſinks to the bottom.

The hemiſpheres are connected by a white ſubſtance, named corpus calloſum, ſeen under the falx, by ſeparating the hemiſpheres cautiouſly, covered by the external lamina of the pia mater, which is conſequently lacerated.

Along the corpus calloſum, two filaments ſeem to run from the fore to the hind part, called raphe, or ſutura, with reſpect to which the others are tranſverſe.

The convolutions of the adjacent and flat ſurfaces of the hemiſpheres overhang the edges of the corpus calloſum conſiderably.

Each hemiſphere, from its baſe, ſends a white cord-like production backwards to the medulla oblongata, called peduncle, or crus.

The ſurface or cruſt of the cerebrum conſiſts of a greyiſh lamina or portion, about one eighth of an inch thick, called cortical, or cineritious ſubſtance, which ſeems to be exceedingly vaſcular.

Within the cortical part is a delicate white fibrous matter, called the medullary or nervous ſubſtance, of which the corpus calloſum is the continuity between the hemiſpheres.

Many ſmall blood veſſels are every where diſperſed in the medullary matter.

When the cortical part is carefully cut off, the medullary ſubſtance exhibits a roundiſh form, upon the whole reſembling that of the entire brain. called centrum ovale ; but it is to be recollected, that this is ſhorn of all its proceſſes that enter the convolutions.

The cerebrum contains three cavities, named ventricles, one in each hemiſphere, called anterior and lateral, and one between both, at their baſes, commonly named the third ventricle.

The lateral ventricle is a long curved cavity, beginning low in the anterior lobe, turning inwards and upwards; it approaches the corpus calloſum, which covers both on the upper part; then it wheels outwards and downwards, ſending a cul-de-ſac, or proceſſus cœcus into the poſterior lobe; and ends in the middle lobe, near its baſe: its courſe not a little reſembles the curve of a ram's horn.

Theſe lateral ventricles are ſeparated at the ſuperior part by a falx of two laminæ, that depends from the corpus calloſum, named ſeptum lucidum, the under edge of which is fixed to the fornix, hereafter deſcribed.

Theſe cavities are lined by a delicate membrane, that ſeems to be the internal lamina of the pia mater.

In the anterior part of the bottom of each, is an oval maſs, called corpus ſtriatum; becauſe it contains medullary matter, diſpoſed in ſtriæ.

Behind this, and in the bottom likewiſe, diſtinguiſhed by a ſlight furrow, is a roundiſh ſubſtance, named thalamus nervi optici; becauſe from its under part the correſponding optic nerve ariſes.

The thalamus of the one ſide touches that of the other, by a pretty broad and flat ſurface.

Behind the thalami, and common to both ventricles, are four tubercules; the two anterior,

rior, the largeſt, have been called nates, the two poſterior, teſtes; over which, in a middle point, is ſituated the glandula pinealis.

The fornix is an expanſion from the inferior edge of the ſeptum lucidum, that lies over the thalami, like an arch, hence the name.

It is connected to the anterior commiſſure of the hemiſpheres by two laminæ, named anterior pillars, from which it widens in a backward direction, covering a large ſhare of the thalami by its thin edges, which have been called pedes hippocampi, that turn downwards in the courſe of the ventricles, and are poſterior pillars; and hence the whole has been named fornix quadricornis.

The under ſurface of the expanded portion of the fornix is called pſalterium, from its peculiar appearance.

Theſe ventricles communicate with another under the fornix, eſpecially at its anterior part, from which, in each, a looſe plexus of veſſels, &c. named plexus choroides, run backward, connected, notwithſtanding, to the fornix and ventricles, ſo as to cut off the communication conſiderably, except before, where it remains free, and the two plexus communicate with one another.

The plexus choroidei, which ſeem to be chiefly venous, are blended behind the fornix with other ſine veſſels, and cover the tubercula quadrigemina; from theſe a vein of great ſize extends to the beginning of the torcular Herophili, called vena Galeni.

Between the anterior portions of the thalami, and under the hole of communication below the anterior part of the fornix, is the ſmall interſtice, called third ventricle; from the bottom of which a contraction, under the name of infundibulum, extends to a round maſs in the ſella turcica, glandula pituitaria: from its hind and upper part another paſſage extends back to the fourth ventricle, under the tubercula quadrigemina, called the aqueduct of Sylvius, and iter a tertio ad quartum ventriculum, which contains valvula magna cerebri.

Cerebellum.

The cerebellum lies below the tentorium and poſterior lobes of the cerebrum; like the cerebrum it is divided by a ſciſſure into two lobes, that receives the falx cerebelli. The lobes are lodged in the poſterior foſſæ of the baſe of the ſkull.

Between theſe lobes is a ſmall one, called protuberantia vermiformis; in ſome meaſure it ſerves to connect them, and is perfectly ſimilar to them in ſtructure.

The ſurface of the cerebellum is formed of concentric arches, or portions of curves, in general diſpoſed from before, backwards; the interſtices are very deep, concealing many ſubordinate arches, and numerous furrows, in the lateral ſurfaces of the arches; into all which the inner lamina of the pia mater, and many very fine veſſels enter.

The cortical ſubſtance is wonderfully extended, in conſequence of the arched eminences and their lateral furrows. The medullary matter is connected with it in ſuch ſort, that a ſmall proceſs of it is in the middle of every eminence.

The proceſſes are all collected, and form a large maſs towards the anterior and inferior part; with reſpect to which, the proceſſes, in a certain point of view, are like ramifications, and the whole, therefore, named arbor vitæ.

The trunk of the medullary ſubſtance is divided into four portions, called crura, diſpoſed as will be deſcribed.

Medulla Oblongata.

This is the ſmalleſt diviſion of the ſenſorium, and lies in the middle of its baſe, from the ſella turcica to the occipital hole, along the cuneiform proceſs.

When viewed in the inverted poſition, from before, it much reſembles the ſcrotum and penis, alſo inverted

Its ſurface is uniformly fibrous and medullary.

The part that reſembles the ſcrotum is foremoſt, and is called tuber annulare, and pons Varolii, becauſe of its form, and the crura cerebri paſſing within it, like two rivers under a bridge.

This tuber annulare is formed by the two anterior crura cerebelli, that meet on its under part in a line or ſuture that may be compared to the raphe ſcroti.

Behind the pons Varolii the medulla oblongata is contracted, and, in the occipital hole, becomes ſpinal marrow; this may be called cauda medullæ oblongatæ, and reſembles the penis.

On the ſides of the cauda are two eminences; below and between theſe are two others; the former are named corpora olivaria, the latter pyramidalia; chiefly produced by the poſterior crura cerebelli.

Between the upper ſurface of the cauda, in the interſtice between the four crura and the protuberantia vermiformis, is a cavity, named fourth ventricle, that communicates before with the aqueduct of Sylvius; in which is ſituated a medullary production, called valvula magna cerebri, and valvula Vieuſſenii; the poſterior extremity, that reſembles a pen, and named calamus ſcriptorius, is ſhut by the pia mater.

Spinal Marrow.

The medulla ſpinalis is a continuation of the cauda medullæ oblongatæ; lodged in the ſpinal canal.

This important ſubſtance is of a roundiſh form, extends from the occipital hole of the ſkull, to the extremity of the os ſacrum, and is covered by the dura and pia matres, diſpoſed as within the ſkull.

On each ſide, correſponding to the intervertebral holes, is a ſulcus of conſiderable depth.

The exterior part is medullary, and the internal cineritious: in this reſpect ſimilar to the medulla oblongata.

Nearly oppoſite to the ſecond lumbar vertebra, the ſpinal marrow becomes a great bundle of nerves, under the name of cauda equina.

The fluids may be extravaſated within the theca of the dura mater, covering the ſpinal marrow, and give compreſſion and its conſequences, which may be removed by trepanning, as mentioned in the Oſteology.

Fragments of the vertebræ may likewiſe give compreſſion, and may require a ſimilar treatment.

Nerves.

Theſe (nervi) are forty pairs of medullary cords, that ariſe from the ſenſorium commune and medulla ſpinalis; of which ten are commonly reckoned to proced from the former; called cerebral nerves; and thirty from the latter, named ſpinal nerves.

Each nerve conſiſts, for the moſt part, of numerous fibrills; ſeverally inveſted by the pia mater, and and jointly by the inner lamina of the dura mater.

In ſome points the nerves become enlarged, in various degree, ſomewhat like tumours; theſe are called ganglia: their ſtructure is not rightly known.

The nervous cords often unite, and croſs their conſtituent fibres variouſly; producing thoſe arrangements, called plexus; ſome of which are very large and remarkable.

Cerebral Nerves.

The firſt, or olfactory pair (nervi olfactorii) ariſe from the inferior parts of the anterior lobes of the cerebrum; near the roots of the corpora ſtriata; and are extended forward to the holes of the ethmoid bone; by which their delicate fibrills deſcend to the noſe, to become the organ of ſmelling.

The trunks of theſe nerves, for which there are particular grooves formed in the anterior lobes of the cerebrum, from compariſon to thoſe of brutes; have been called proceſſus mamillares.

The ſecond, or optic pair (nervi optici) ſpring from the thalami, and incline to one another before the ſella turcica, where they are cloſely united; from this they diverge to their proper holes, to reach the bottoms of the orbits and poſterior ſurface of the eye-balls, which they enter, and become retinæ, or the organs of ſeeing.

The third pair (nervi oculorum motorii) take their riſe from the crura cerebri, near the pons Varolii, and proceed to the orbits, through the cavernous ſinuſſes and ſuperior orbitar fiſſures, to the muſcles of the eye-balls, particularly the recti: hence the name.

The fourth pair (trochleatores) ariſe from the roots of the tubercula quadrigemina, and enter the cavernous ſinuſſes, through ſmall holes in the beginnings of the edges of the tentorium, to reach the orbits and the trochleares muſcles of the eye-balls, on which they are entirely beſtowed: hence the name.

The fifth pair (nervi trigemini) are derived from the crura cerebelli, immediately behind the pons Varolii, and enter the cavernous ſinuſſes, where each having formed a ganglion, is divided into three branches: hence the name.

The firſt, or opthalmic branch, goes to the orbit, and gives the frontal, lachrymal, and naſal nerves.

The ſecond, or ſuperior maxillary branch, paſſes from the cavernous ſinus through its proper hole, and is divided into three, ſpheno-palatine, poſterior alveolary, and infra-orbital nerves.

The ſixth pair (nervi adducentes) ariſe between the corpora pyramidalia and pons Varolii, and enter the cavernous ſinus by holes in the dura mater, behind the ſella turcica, where a ſmall branch from each is ſuppoſed to go out by the carotid holes, to become intercoſtal nerves; they then reach the adductores muſcles of the eye-balls: hence the name.

The ſeventh, or auditory pair (nervi acouſtici) is in fact a double pair; for on each ſide is a portio mollis that goes to the tympanum, &c. and becomes an organ of hearing; and a portio dura, that paſſes out by the aqueduct of Fallopius, and in its paſſage gives off a ſmall branch to the tympanum, named chorda tympani, while the trunk under the parotid gland is extenſively ramified to the face, temples, &c. hence compared to the pes anſerina.

The eighth pair (par vagum) ariſe from the ſides of the corpora olivaria in diſgregated fibrills; and, before they iſſue from the ſkull, each is joined by a branch, aſcending from the fifth or ſixth ſpinal nerves (nervi acceſſorii Williſſii) which ſoon ſeparate, and are loſt in the ſterno-cleido-maſtoidei, and cucullares muſcles.

This pair, deſcending by the holes common to it and the internal jugular vein, gives off branches to the tongue, &c.

The trunks run down the ſides of the neck, between the common carotids and internal jugulars, and enter the thorax; from which a conſiderable branch on each ſide is reflected to the larynx, under the name of recurrent nerves.

Branches from this eighth pair are joined by others from the intercoſtals, &c. and form the cardiac, two pulmonary, oeſophageal plexus, &c.

The trunks deſcend along the oeſophagus, the right one behind, and the left one before it, and theſe reach the abdomen through the cardiac orifice of the diaphragm, and, together with the intercoſtals, produce the two gaſtric, the hepatic, the ſplenic, and two renal plexus.

The ninth, or lingual pair (nervi linguales) ſpring from the inferior part of the corpora pyramidalia, and go out by their proper holes in the occipital bone; after communicating with the eighth pair, and firſt cervicals, they are tranſmitted to the tongue, between the internal jugular veins and carotid arteries reſpectively.

The tenth pair, by ſome reckoned along with the ſpinal nerves, ariſe from the ſides of the medulla oblongata, and go out between the occipital bone and firſt vertebra, to the ſides of the neck.

The Spinal Nerves.

Each ſpinal nerve is made up of fibrils that ariſe on each ſide of the longitudinal correſponding ſulcus in the ſpinal marrow; theſe run towards one another, and paſs jointly through the vertebral holes.

The ſpinal nerves, arranged in pairs, are, like the vertebræ, diſtinguiſhed into

Seven cervical,
Twelve dorſal,
Five lumbar,
Six ſacral.

The firſt cervical pair are tranſmitted through the holes between the firſt and ſecond vertebræ; ſome of the branches, joining with thoſe of the tenth cerebral, intercoſtals, and ſecond cervical, ſupply the flexor muſcles of the head principally.

The ſecond cervical pair paſs between the ſecond and third vertebræ, and communicate with the adjacent nerves, and are diſtributed chiefly to the platyſmata myoidea.

The third cervical pair, after going out between the third and fourth vertebræ, are connected with the ſecond and fourth, and they produce the phrenic nerves, that paſs into the cheſt, between the ſubclavian arteries and veins, and run along each ſide of the pericardium to the diaphragm.

The fourth cervical pair go out between the fourth and fifth vertebra, after giving off ſmall branches, they run downwards, between the ſcaleni anticus and medius, to the brachial or axillary plexus.

The fifth cervical pair are tranſmitted between the fifth and ſixth vertebræ, in the interſtice of the ſcaleni muſcles, to the brachial plexus.

The ſixth cervical pair go out between the ſixth and ſeventh vertebræ, and, in the interſtice of the ſcaleni muſcles, to the brachial plexus.

The ſeventh cervical pair are tranſmitted betwixt the laſt cervical and the firſt dorſal vertebræ, to the axillary plexus.

The firſt dorſal pair go alſo to the axillary plexus.

The axillary plexus, produced by the intermixture of the ſpecified nerves, has a peculiar meſhy diſpoſition, and through one of its holes tranſmits the axillary artery. It ſends off the following principal branches to the ſuperior extremity :

1 Nervus cutaneus ; this runs down, not far from the artery, and is diſtributed to the integuments of the internal part of the fore-arm and palm :

2 Nervus muſculo-cutaneus, or perforans Caſſerii, that paſſes through a hole in the coraco-brachialis muſcle, and is diſtributed to the biceps flexor cubiti, brachialis internus muſcles,

and the integuments of the external part of the fore-arm and hand:

3 Nervus muſcularis, that paſſes between the os humeri and muſcles, in an outward direction, to the extenſor muſcles of the arm and hand, and reaches the back of the hand near the thumb:

4 Nervus ulnaris; this runs down the inſide of the arm to the hollow between the internal condyle of the os humeri and olecranum, and then principally follows the courſe of the ulna, to the wriſt, where a branch is ſent backwards. The trunk paſſes by the edge of the os piſiforme, within the ligamentum carpi arterius, to the palm, and gives two branches to the little finger, and one to the contiguous ſide of the ring finger: theſe run along the ſheaths of the tendons to their points:

5 Nervus radialis, which lies near the humeral and radial arteries; at the wriſt it ſends a branch backwards, and then proceeds within the ligamentum carpi arterius to the palm, where it gives two branches to the thumb, fore-finger, and middle finger, and one to the ring-finger, that run along the ſheaths of the tendons like thoſe of the ulnar nerve:

6 Nervus articularis, that paſſes under the head of the os humeri to the muſcles adjacent:

7 Nervus ſcapularis, which, through the notch in the ſuperior coſta of the ſcapula, is diſtributed to the muſcles on the ſcapula.

The remaining eleven dorſal pairs principally run forward in the interſtices of the ribs, under the name of intercoſtals.

The firſt, ſecond, third, and fourth lumbar pairs, after giving branches to the pſoas and other muſcles, form a plexus that may be called lumbar; from which go off,

1 Nervus cruralis anterior, that lies on the pſoas muſcle, and runs to the leg along with the iliac veſſels, in the interſtice of the pſoas and iliacus internus muſcles, and behind Paupart's ligament; it immediately diſtributes large and numerous branches to the extenſor muſcles, on the fore part of the thigh; one runs down in the courſe of the femoral artery; and another follows the vena ſaphena to the upper ſurface of the foot.

2 Nervus cruralis medius vel obturatorius, which runs between the iliac veſſels and brim of the pelvis, and paſſes through the deficiency of the obturator ligament, along with an artery of that name, to the adductor and other muſcles, on the inſide of the thigh.

The fifth lumbar nerve joins with the ſacral nerves, and make a plexus that may be called ſacral; from which are derived

3 Nervus iſchiaticus vel cruralis poſterior, that, after a ſhort lateral courſe between the pyriformis muſcle and ſacro-iſchiatic ligaments, is ſituated between the os iſchium and trochanter major, upon the gemini and quadratus muſcles.

This, the largeſt nerve, runs down the poſterior part of the thigh to the ham, where it touches the veſſels, and is nervus poplitæus: in this courſe it gives off branches, and particularly a large one, forwards, over the head of the fibula, to the muſcles in the interſtice of the bones of the leg, that extends to the ſuperior part of the foot; and one that runs down along the ſurface of the gaſtrocnemius, to the foot.

The trunk paſſes between the heads of the gaſtrocnemius muſcle, and follows the arteria tibialis poſtica to the ſole, by the hollow below the inner ankle; and is divided into the external and internal plantar nerves that are diſtributed to the toes, nearly as the ulnar and radial nerves are to the fingers.

4 Nervus pudicus, that runs with the correſpondent veſſels to the pudenda, under the arch of the pubes.

Small branches go to the rectum, bladder, &c. from the inferior ſacral nerves.

Through the poſterior holes of the os ſacrum branches are tranſmitted to the adjacent parts.

The great intercoſtal nerves are a common production from all the ſpinal ones at leaſt; and, on account of the great ſympathy of parts theſe produce, they have been called the great ſympathetic nerves by Winſlow.

It has been mentioned, that on each ſide through the carotid hole a branch deſcends from the ſixth pair; alſo a ſmall one from the ſecond of the fifth pair: theſe, united, run down between the bodies and tranſverſe proceſſes of the vertebræ, along the neck, to the thorax, and receive the branches from the cervical nerves, and form three anterior ganglions, called cervical.

The uppermoſt ganglion, of an oblong form, is oppoſite to the ſecond vertebra; the middle one lies before the fifth vertebra; and the undermoſt on the ſide of the laſt one, behind the ſubclavian artery, from which, joined with fibrils from the eigth pair, branches deſcend to form the cardiac plexus.

The intercoſtals deſcend between the pleuræ and vertebræ, receiving branches at every vertebral interſtice; at which, likewiſe, ganglions, that may be called lateral, are formed.

At the diaphragm the intercoſtals join, and produce the nervus inteſtinalis, or ſplanchnicus, beſtowed on the viſcera.

The trunks again ſeparate from one another, and each produces a ganglion by the ſide of the aorta, called ſemilunar ganglions; from which branches are propagated that form the ſolar plexus.

From the ſemilunar ganglions and ſolar plexus, branches run variouſly to form the following plexus:

1 The cœliac. 2 The hepatic. 3 The ſplenic. 4 The ſuperior meſenteric. 5 The renal. 6 The inferior meſenteric. 7 The meſocolic. 8 The hypogaſtric. 9 The ſpermatic.

SPLANCH-

SPLANCHNOLOGY.

SPLANCHNOLOGY, in a ſtrict acceptation, treats of the viſcera; but in a more extenſive one, of other parts, ſuch as the eyeball, membranes, &c.

Abdomen.

The oſſeous and muſcular containing parts of the lower belly have been deſcribed in the Oſteology and Myology; within theſe is another, called

Peritonæum.

This is an extenſive membrane of one lamina: its external ſurface is attached to the muſcles, &c. by cellular ſubſtance; while its internal one is ſmooth and gliſtening, like that of the dura mater.

The ſpace comprehended within this membrane is peritonæal cavity (cavum peritonæi) and in the healthful ſtate is poſſeſſed only by the halitus, or lymphatic exudation, that takes place from the ſurfaces of all membranes, eſpecially thoſe that have cavities.

This cavity is the ſeat of aſcites, and ſome other effuſions.

The peritonæum has many inward proceſſes of various form and extent, in which the greateſt part of the viſcera are lodged, &c. ſo that theſe are in fact on the outſide of this membrane, deriving from it, however, their peritonæal coat, which, in moſt inſtances, has the effect of a ligament.

The peritonæum paſſes ſmoothly along the umbilical and inguinal rings; by which it happens, that when any viſcera is protruded ſo as to form hernia, the peritonæum is puſhed along, and becomes the ſac.

The abdominal containing parts may be arranged under the following heads:

I. Inteſtinal, or digeſtive;
  1 The inteſtine,
  2 The meſentery,
  3 The omentum.

II. Biliary;
  1 The liver,
  2 The ſpleen,
  3 The pancreas.

III. Urinary;
  1 The kidnies,
  2 The renal capſules,
  3 The ureters,
  4 The bladder.

IV. Genital organs.

The inteſtine is a tube of various capacity, of great length, and artfully convoluted, ſo as to occupy the greateſt ſhare of the abdominal ſpace.

It conſiſts of

1 Stomach,
2 Inteſtine, ſtrictly ſo called.

The Stomach.

This (ventriculus) is a capacious bag, that occupies the upper part of the abdomen.

Its great extremity lies in the left hypochondrium, while its ſmall one is ſomewhat lodged in the right.

This organ has two orifices, one named cardiac (cardia) that joins with the œſophagus, immediately under the diaphragm, and through its cardiac opening, and oppoſite to the ſpine; ſo that the great extremity projects conſiderably beyond it. The other, called pyloric (pylorus) two or three inches to the right of the other, and ſomewhat lower, is connected to the inteſtine.

The poſterior ſurface, or edge of the ſtomach, between the orifices, exhibits a great notch, that is called the little arch or curvature; while the oppoſite part, convex and more extenſive, is named its great arch or curvature.

Large branches of veſſels, called coronary, ſweep along or near theſe arches, ſending out

many

many anaſtomoſing ramifications to every part of the ſtomach.

The arteries are derived from the middle or gaſtric branch of the cœliac.

The ſtructure of the ſtomach, upon the whole, is the ſame with that of the œſophagus and inteſtine.

The Inteſtine.

The inteſtine, or alimentary canal, extended from the pylorus to the anus or perinæum, is divided by anatomiſts into

1 Small (inteſtina tenuia)
2 Great (inteſtina craſſa).

The ſmall inteſtine, leſs capacious than the other, is ſubdivided into

1 Duodenum,
2 Jejunum,
3 Ilium.

The firſt begins at the pylorus, and is reckoned to be twelve fingers breadth, of the ſubject to which it belongs, in length. It ſtretches in a curved manner acroſs the ſpine, to the left, and is joined to the ſecond, of uncertain length; and this to the third, that ends, after it and the ſecond have formed numerous convolutions, oppoſite to the right foſſa iliaca, or near the right haunch.

The pylorus is a contraction, ſomewhat like a ring or anus, and at ſame time prevents the contents of the ſtomach to paſs off too readily, and *vice verſa.*

The duodenum has a hole in its upper edge to receive the gall and pancreatic ducts; and is not inveſted with the peritonæum in the ſame way as the others.

The ſurface, called interior, which is in fact exterior, is ſpread over with numerous membranous doublings, called valvulæ conniventes.

The great inteſtine is likewiſe ſubdivided into

1 Cœcum,
2 Colon,
3 Rectum.

The cœcum is very ſhort, and lies in the right iliac foſſa, and is a cul-de-ſac, partially covered by the peritonæum; it touches the iliacus internus muſcle with the interpoſition of cellular ſubſtance.

It has been propoſed to open it by inciſion without wounding the peritonæum, with a view to extract indurations that ſometimes are formed there *: a ſpeculative operation, comprehended under enterotomy.

A little proceſs, called vermiformis, from reſemblance to the earth-worm, hangs down from the cœcum; it exactly poſſeſſes the inteſtinal ſtructure.

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* I have ſpecimens of ſuch indurations: they ſeem to conſiſt principally of the fæculent part of the ingeſta.---- One was very large, and was ſuppoſed, by ſome who examined the patient while alive, to be an extra-uterine fœtus.

The colon is the moſt extenſive. It begins from the cœcum; the two are diſtinguiſhed by the inſertion of the ilium, or end of the ſmall inteſtine, which projects a little into their cavity under the name of valvula coli: it ought rather to be called valvula ilii. It ſomewhat reſembles the pylorus, and prevents regurgitation.

The colon extends upwards to the liver, and then ſweeps to the left ſide, a little above the umbilicus, forming the arch of the colon, that in ſome reſpects is a tranſverſe partition of the abdominal cavity. It nearly touches the ſpleen, and deſcends towards the left foſſa iliaca, where it forms a double curvature, near the brim of the pelvis, called ſigmoid flexure, and, at the top of the os ſacrum, ends in the rectum.

Three longitudinal bands or ſtrips can be traced along the colon, under the name of ligaments; they collect it into boſſes or cells, called cellulæ coli.

The rectum lies on the anterior face or concavity of the os ſacrum, and terminates by a valve-like orifice, about an inch before the os coccygis, under the name of anus.

The rectum is only partially covered by the peritonæum; for the poſterior part of it, by the intervention of cellular ſubſtance, adheres to the perioſteum of the os ſacrum.

The whole of the œſophagus, as well as inteſtine, are formed of a tubular inflection of the integuments, beginning from the mouth, and ending in the common ſurface at the anus; by this means the cuticula immediately bounds the cavity, and has been called villous coat (tunica villoſa); the cutis vera inveſts it under the name of nervous coat (tunica nervea). The valvulæ conniventes are principally formed by doublings of theſe coats.

A muſcle that has been called muſcular coat incloſes theſe membranes, and completes the inteſtine.

The inteſtinal muſcle conſiſts of two layers of fibres, the one longitudinal, the other tranſverſe, more or leſs, which are capable to narrow the tube, by partial and ſucceſſive action, called vermicular and periſtaltic motion, to propel the contents downwards.

The inteſtine has its arteries from the ſuperior and inferior meſenteric trunks, and returns the correſponding veins to a great common trunk that ends in the ſinus of the liver; on this account called vena portarum, and abdominal, to diſtinguiſh it from the part of this veſſel within the liver, named hepatic.

The inteſtinal nerves are derived from the adjacent plexus.

The cuticular ſurface of the inteſtine abounds variouſly with glands or follicles of the mucous kind, which produce the lubricating and protecting fluids with which it is done over. In the ſtomach they ſecrete what is commonly named gaſtric fluid, which by no means is ſo abundant as has been ſuppoſed.

From the cuticular ſurface numerous abſorbent veſſels ariſe under the name of lacteals (vaſa lactea) from the accidental circumſtance of their being ofteneſt ſeen full of chyle, a milk-like fluid. They are, in fact, in no reſpect different from the abſorbents, commonly called lymphatics, and will be afterwards deſcribed.

The Meſenery.

The meſentery (meſenterium) a doubling of the peritonæum, is one of its largeſt proceſſes.

It ariſes ſomewhat obliquely from its poſterior ſurface, oppoſite to the uppermoſt lumbar vertebra.

It is of various breadth, and the edge is artfully rumpled ſo as ſuddenly to acquire extent equal to the length of the inteſtine.

Its inteſtinal edge, which covers the whole of the inteſtine, with the exceptions formerly mentioned, under the name of outer, or peritonæal coat, begins at the left extremity of the duodenum, and inveſts the jejunum and ilium; and at the cœcum it becomes narrow, and may be ſaid to end.

Towards the liver, where it is connected to the colon, it begins to widen, and has been called right ligament of the colon; from which it extends to the left, and its greateſt breadth correſponds to the arch of the colon, and principally forms the tranſverſe partition, already mentioned: in the left hypochondrium it again becomes narrow, and is named left ligament of the colon: it widens at the ſigmoid flexure, and finally terminates at the upper part of the rectum.

As far as the meſentery is connected with the colon and rectum, it is commonly called meſocolon, and meſorectum.

The edge of the meſentery, which, like a ſling, inveſts the inteſtine, and limits its locomotion in the ſtile of a general ligament, exhibits a curvature ſomewhat like a ſcroll.

The interſtice of the meſenteric laminæ contains the ramifications of the inferior meſenteric artery, beautifully arched, and anaſtomoſing, going to the ſmall inteſtine; and that of the meſocolon, the ſuperior one principally, going to the great inteſtine, as well as the correſponding veins, combining to form the trunk of the vena portarum abdominalis.

This interſtice alſo ſupports the inteſtinal nerves, extending from the plexus to the inteſtine, and the lacteal veſſels, running towards the ſpine, and their couglobate glands, under the name of meſenteric glands.

The Omentum.

This membrano-adipoſe ſubſtance principally hangs down from the great curvature of the ſtomach, and arch of the colon; and accordingly this portion of it is called great omentum, to diſtinguiſh it from a leſs portion that fills up the ſpace between the ſmall curvature of the ſtomach, liver, &c. under the name of ſmall omentum.

On the right ſide the great omentum is connected to the biliary ducts, between the liver and colon; on the left, to the ſpleen; and between theſe points to the ſtomach and colon, as deſcribed.

The pendulous part is of various extent, commonly ſufficient to cover the convolutions of the ſmall inteſtine.

It is in a great meaſure a production of the peritonæum, being obviouſly continued from the peritonæal coats of the ſtomach and colon; ſo, however, as to form a great cavity or bag.

This omental cavity is principally between the inferior ſurface of the ſtomach and the ſuperior ſurface of the meſocolon, and communicates with the peritonæal cavity by a hole ſufficient to admit the finger, immediately behind the biliary ducts, called moſt properly foramen Winſlowii; becauſe Winſlow, a moſt eminent anatomiſt, firſt deſcribed it, together with the real ſtructure of the omentum.

Along the pendulous omentum, by ſome called gaſtro-colic portion, veſſels of conſiderable ſize are diſpoſed, principally from the inferior coronary artery, that are capable to give conſiderable hæmorrhage; therefore the ſurgeon ought to act cautiouſly when he is treating hernia, in which it is often included.

Upon the ſigmoid flexure of the colon, and upper part of the rectum, are fatty flaps or proceſſes, very much of the omental ſtructure, and therefore named appendices epiploicæ.

The Liver.

This (hepar) is a large glandular maſs, lying principally in the right hypochondrium.

Its form is ſuited to its ſituation; for its upper ſurface is convex, agreeably to the concavity of the diaphragm; while its under ſurface is concave, correſpondent to the convexity of the ſtomach.

The poſterior edge is thick, and has an excavation oppoſite to the ſpine; the anterior one is curved, agreeing moſtly with the line formed by the cartilaginous extremities of the ribs.

The liver is cloſely fixed to the diaphragm by the excavation; and alſo to the vena cava by large veins, called hepatic, to be afterwards deſcribed.

Beſides this adheſion the liver is variouſly connected to the adjacent parts by doublings of the peritonæum (which inveſts the whole of it except the excavation) under the name of ligaments.

There is a broad doubling that connects its convex ſurface to the abdominal muſcles, nearly in the direction of the linea alba, and to the diaphragm, called ſuſpenſory ligament; its anterior edge, that extends towards the umbilicus, includes a cord-like ſubſtance that in the fœtus was umbilical vein: this is continued through a notch in the anterior edge to the concave ſurface of the liver.

This ligament is the limit of what are called the lobes of the liver; for all to the right of it is called the great lobe, and to the left of it the ſmall lobe; conſequently it will be underſtood that the left lobe extends ſomewhat into the left hypochondrium, and that the thin edge may be felt, by careful preſſure of the fingers, near the ſternum.

Two ſmall doublings of the peritonæum tie theſe lobes to the diaphragm reſpectively, and are called right and left ligaments of the liver.

In the concave ſurface, beginning in the great, and extending to the ſmall lobe, and neareſt the poſterior edge, is a ſciſſure, commonly called ſinus of the liver.

From the notch at the ſuſpenſory ligament, there is a hole or canal that reaches to this ſinus, which allowed the umbilical vein alſo to reach it.

Between the ſinus and the poſterior edge is a proceſs, called lobulus Spegellii; and oppoſite to this, on the other ſide, is almoſt a ſimilar one, called lobulus anonymus.

On the right ſide of the lobulus Spegellii is a channel leading backward from the ſinus, that in the fœtus lodged the canalis venoſus.

The ſinus of the liver, thus ſurrounded with eminences, has been compared to portæ, or gates, and hence named ſinus portarum, by the ancients; and the inteſtinal vein that enters the liver through it has been alſo called vena portarum.

The liver is made up of a vaſt multitude of follicles and their blood and excreting veſſels, for the purpoſe of preparing the bile or gall.

The vena portarum, as it approaches the ſinus, divides into two branches; theſe run, the one to the right, the other to the left lobe, diſappearing in the extremities of the ſinus, and are gradually ſubdivided into minute ramifications that perhaps conſtitute at and enter the follicles, conveying to them the blood from which the bile is ſecreted; a function performed to all other glands by arteries.

The extremities of theſe veins are reflected ſo as to return the blood from the follicles, and, gradually uniting, form the hepatic veins formerly mentioned, generally three in number, that go out of the liver by the evacation in its poſterior edge, to join the vena cava inferior as it paſſes through the diaphragm,

phragm, and conſequently near the right auricle of the heart, where it ends.

From each follicle an excreting duct is produced. The gradual adunation of theſe numerous ducts, called commonly pori biliarii, forms two large ones, that become apparent in the extremities of the ſinus, and ſoon unite into the hepatic duct, which tends downwards.

The hepatic duct, about two inches from the ſinus, is connected with another duct; between the two is an acute angle.

This duct leads back to an oval cyſt of conſiderable ſize, adhering to the concave ſurface of the great lobe, and partly lodged in a particular excavation or foſſa, ſo diſpoſed that its fundus is turned forwards, and a little downwards, and generally projects ſomewhat beyond the thin edge. It is called gall-bladder (veſicula fellea); becauſe it is found more or leſs filled with gall; and its duct that joins the hepatic one, as mentioned, is named cyſtic duct.

Where the cyſtic duct joins with the bladder there is a particular curvature, which may produce, in ſome degree, the effect of a valve, ſo as to prevent the too ready tranſmiſſion of the bile.

The gall-bladder conſiſts of two complete coats and a partial one, the latter derived from that of the liver, and conſequently from the peritonæum, may therefore be called peritonæal;

the others are continuations of thoſe of the inteſtine, and therefore may be called cuticular and cutaneous; the laſt, immediately forming the cavity, has been obſerved to abound with rugæ ſomewhat in the ſtile of lozenges *.

The trunk conſtituted by the union of the hepatic and cyſtic ducts, under the name of ductus commune cholidochus, reaches the upper ſurface of the curvature of the duodenum, about four inches from the pylorus, which it pervades ſlantingly; and its orifice is ſurrounded by the valvulæ conniventes, artfully diſpoſed as if to protect it.

It thus appears, that all the gall produced in the follicles is directly conveyed to the duodenum, except that which, by regurgitation through the cyſtic duct, reaches the gall-bladder; between which and the pori biliarii there does not ſeem to be any other connection.

A conſiderable artery, named hepatic, derived from the cœliac one, enters the ſinus of the liver, previouſly divided into two or three branches, and is minutely diſperſed.

The hepatic artery, it would ſeem, carries blood for the nutrition of the liver, which falls into the hepatic veins.

A production from the peritonæum runs into the ſinus of the liver, and inveſts its veſſels, under the name of capſula Gliſſonii.

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* See an elaborate Treatiſe de Hepate, &c. by Dr. F. A. WALTER, of Berlin, my ingenious friend, who ſeems to have beſtowed immenſe attention on his ſubject.

Numerous lymphatic veſſels originate in the liver; thoſe on the convexity tend upwards, through the diaphragm to the thorax; thoſe on its concavity fall into the thoracic duct, below the diaphragm *.

The Spleen.

This (lien) is of an oval form, of conſiderable thickneſs, and various magnitude. It is ſituated longitudinally between the great extremity of the ſtomach and the diaphragm; and accordingly the ſurface that reſpects the latter is convex, and the former concave.

In the concave ſurface is a longitudinal ſinus, or ſciſſure, a good deal reſembling that of the liver; which likewiſe ſerves for the tranſmiſſion of veſſels.

The ſubſtance of the ſpleen is ſpongy and lax, and, according to ſome anatomiſts, cellular. It is covered by a coat derived from the peritonæum.

The left branch of the cœliac artery, in a winding courſe above the pancreas, and behind the ſtomach, enters its ſinus, and is minutely diſperſed, under the name of ſplenic artery.

Veins emerge from the ſplenic ſinus and communicate with thoſe of the ſtomach, under the name of vaſa brevia, and the whole finally terminate in the vena portarum, near its trunk.

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* See an ingenious Anatomical Faſciculus, by WERNER and FELLER.

The ſpleen has its nerves from the ſplenic plexus, and ſends its lymphatics towards the bottom of the thoracic duct.

It ſeems highly probable that this glandular-like maſs ſerves to prepare a quantity of blood, not inteſtinal, by retardation eſpecially, to be ſent to the liver along with the inteſtinal blood, to favour the more perfect ſecretion of the bile, and of conſequence is properly claſſed as a biliary organ.

The Pancreas.

The pancreas is a glandular maſs, reſembling a dog's tongue, of which the thick extremity is attached to the curvature of the duodenum, near the pylorus, and the ſmall one to the ſpleen ; of conſequence it is ſituated tranſverſely in the poſterior part of the omental cavity, ſo that its anterior ſurface makes a part of the boundary of it.

A ſmall proceſs from its thick extremity runs ſomewhat along the curvature of the duodenum, and is called little pancreas (pancreas parvum).

The pancreas is a collection of ſmall glands, which much reſemble the ſalivary ones ; from each of which an excreting duct is produced that runs to a common longitudinal trunk in the middle, gradually enlarges as it approaches to the duodenum, a good deal like a feather, where it receives the common duct of the little pancreas, and then enters the duodenum, along with or very near the biliary duct.

Its arteries are derived from the cœliac and ſuperior meſenteric arteries; and its veins are remitted to the ſplenic and meſenteric branches.

This large gland is unqueſtionably ſubſidary to the ſalivary ones, and immediately ſerves to dilute the bile upon its effuſion into the inteſtine.

May not indurations of this gland, by affecting the biliary ducts, give jaundice?

The Kidnies.

Theſe (renes) are two oval glands, ſituated in the poſterior part of the abdominal cavity, one on each ſide of the ſpine, and deſtined to ſecrete the urine.

The left one touches the ſpleen by its ſuperior extremity, as does the right the liver; but as the liver is larger than the ſpleen, it occupies ſpace in proportion, and of conſequence the right kidney is a little lower than the left one.

In the edge that is turned to the ſpine the kidney has a ſinus or ſciſſure, like thoſe of the liver and ſpleen, and anſwering the ſame purpoſe, viz. the tranſmiſſion of veſſels: the oppoſite edge is regularly curved.

Although the ſurface of the kidney is ſlightly lobular in the fœtus, yet in the adult it is ſmooth, and is covered by its tunica propria.

The following ſtructure is diſcovered by inciſion, injection, &c.

The exterior part of its ſubſtance, called cortical, becauſe it ſurrounds all the other parts, ſeems to be glandular.

Within the cortical part, and originating from it, are collections of tubes (tubuli uriniferi Belliniani) running inwards, like pencils, to form papillæ or little eminences, about fourteen in number.

In the interſtices of the tubular collections the cortical part is ſomewhat elongated, ſo as to be of unequal thickneſs.

Each papilla, at a ſmall diſtance from its point, is ſurrounded with a tubular membrane, named infundibulum, which, at the point of the papilla, becomes narrow.

The number of infundibula equals the number of papillæ. Beyond their contractions, towards the interior edge of the kidney, they all unite, and form a common cavity, called pelvis of the kidney; which chiefly lies in the ſinus, and being contracted becomes ureter.

It thus appears, that every particle of fluid tranſmitted by the uriniferous tubes muſt fall into an infundibulum, and of conſequence be depoſited into the pelvis, and conveyed to the ureter.

The blood is tranſmitted to the kidneys by the renal or emulgent arteries; one (ſometimes two) to each, that deſcend a little to reach the ſinuſſes, where, ſubdividing into two or three branches, they ramify farther, and ſurround the pelves and infundibula with arches or anaſtomoſes, from which the cortical ſubſtance is copiouſly ſupplied with extreme branches.

The blood is returned by correſponding veins, that, emerging from the ſinuſſes, produce the emulgent veins, of which the left is the longeſt; becauſe it paſſes before the aorta to reach the vena cava.

The nerves ſent to the kidneys are derived from the renal plexus; and the lymphatics from them reach the thoracic duct.

The kidneys are ſituated between the peritonæum and quadrati lumborum muſcles principally, and much ſurrounded with cellular ſubſtance.

It will be underſtood, that an inciſion, called nephrotomy, may be made from the lumbar region, ſo as to reach the pelvis of a kidney for the purpoſe of extracting the ſtone (calculus) without wounding the peritonæum; but that this muſt be a difficult and precarious operation.

It will farther be underſtood, that inflammation of the kidney (nephritis) ending in ſuppuration, may be ſo extended as to reach the lumbar muſcles, &c. and not only become apparent but diſcharge its pus externally.

Renal

Renal Capſules.

Theſe (capſulæ renales, glandulæ atrabiliariæ) are two gland-like bodies, ſituated between the upper extremities of the kidneys and the ſpine; cloſely adhering to the former. Their middle portions are ſomewhat triangular.

In each is a ſmall longitudinal cavity, containing commonly a black matter (atra bilis).

No excreting ducts have been diſcovered.

They have no other connection with the urinary organs except proximity.

May we ſuppoſe that the fluid contained in theſe capſules is a ſecretion, and that it is carried by the abſorbents to the bottom of the thoracic duct, to promote the action of that principal veſſel?

The Ureters.

Theſe (ureteres) are two ſlender tubes, each about the ſize of a ſwan's quill; they are contractions, or continuations of the pelves of the kidneys reſpectively; they deſcend almoſt perpendicularly to the brim of the pelvis; paſſing before the iliac veſſels, they ſink between the pelvis and urinary bladder, to reach the poſterior and under part of the cervix of the latter, through which they penetrate obliquely, and terminate on its ſurface by ſmall oval orifices, about an inch diſtant from one another. The ſlanting penetration has the effect of valves, and prevents regurgitation.

In ſome rare caſes two ureters have been obſerved on one ſide.

Through their whole courſe the ureters lie behind the peritonæum.

The Bladder of Urine.

This (veſica urinaria) is a large oval cyſt or bag, ſituated in the anterior part of the pelvis, immediately behind the bodies of the oſſa pubis, which are ſomewhat excavated for its reception.

The upper part or bottom (fundus) is covered with the peritonæum, reflected from the adjacent ſurfaces; the poſterior part of its middle or body (corpus) is likewiſe covered by this membrane, from which it is reflected, in the male, upon the rectum, and, in the female, upon the uterus. The under part or neck (cervix) is ſurrounded with cellular ſubſtance, and terminates forwards, immediately behind the arch of the pubes, in a contraction or tube, called urethra.

The poſterior and inferior part of the cervix reſts on the rectum in the male, and on the vagina in the female; cellular ſubſtance alone being interpoſed: a circumſtance to be carefully remembered by the ſurgeon, eſpecially the lithotomiſt.

The bladder enjoys a ſtructure either the ſame with, or very ſimilar to that of the inteſtine.

The partial peritonæal coat has been already taken notice of.

The next or muſcular coat is ſtrong, and the fibres are ſo arranged as to draw the fundus towards the cervix; by which means its capacity is conſtantly proportioned to its contents.

At the cervix the fibres, under the name of ſphincter veſicæ, have the power of ſhutting the beginning of the urethra, ſo as to detain the urine till an expulſive effort of ſuperior force be made.

The interior membranous coat, analagous to the nervous and villous inteſtinal coats, and like thoſe derived from the cutis and cuticula, are apparently continued ſo as principally to form the ureters, and perhaps the pelves and infundibula of the kidneys.

The internal or villous coat is raiſed into numerous little eminences, by follicles of the mucous claſs that prepare the mucus for protection againſt the action of the urine; which, when morbidly abundant, gives the diſeaſe called cyſtirrhœa.

When the bladder is diſtended its fundus can be felt like an internal tumour, by the hand properly applied on the hypogaſtrium, and the interſtice between the peritonæum reflected from the abdominal muſcles and brim of the pelvis, is increaſed, ſo that the high operation for the ſtone may be performed without wounding that important membrane.

The Urethra.

This, in both ſexes, is a tube continued from and formed by the membranes of the bladder, and nearly reſembles the ureters in ſize and ſtructure.

In the female it is about an inch in length, and terminates in the common integuments of the pudenda, immediately without the arch of the pubes.

In the male it is much longer than in the female, for it ſtretches along the inferior part of the penis to its extremity, and terminates likewiſe in the common integuments, of which it is entirely conſtituted, as far as it is a urinary tube. But in this ſex it anſwers a double purpoſe, being a ſeminal as well as a urinary duct; and, therefore, to enable it to propel the ſemen duly, a cavernous covering is ſuperadded, which will be deſcribed along with the male organs.

It will be underſtood that a ſtraight probe, or tube (the firſt is called ſtaff, and the laſt catheter) may be introduced into the female bladder, by the urethra, for the purpoſes of ſurgery; but in the male theſe inſtruments muſt have a conſiderable curvature, to allow them to paſs around the margin of the arch of the oſſa pubis, and to mount into the bladder behind it, in the direction of the urethra.

Attention to this point is eſſential to ſucceſs in the operations of ſounding and catheteriſm; or in uſing the ſound and catheter.

The Genital Organs.

The genital organs of the male are,

The teſticles,
The penis.

Thoſe of the female are,

The ovaria,
The uterus,
The Fallopian tubes,
The vagina,
The os externum uteri.

The Teſticles.

Theſe (teſtes) are two oval glands that prepare the ſemen, and of courſe are the principal male organs, to which the other parts of the genital ſyſtem are entirely ſubordinate.

The teſtes, after birth, are pendulous from, and ſituated below the rings of the external oblique abdominal muſcles, in a cutaneous bag, named ſcrotum.

Each teſticle conſiſts of a body, a proceſs, called epididymis, and excreting ducts.

The body is undermoſt, and its extremities are turned forwards and backwards; the anterior one is higheſt.

The epididymis lies above the body of the teſticle, and is ſomewhat like a leech in ſhape.

The body of the teſticle conſiſts of cellular lobules, eaſily ſeparated from one another, but all attached to the upper part of the teſticle that correſponds to the epididymis, which ſome call its dorſum.

Each lobule contains a delicate convoluted tube, or excreting duct, that runs towards the dorſum.

The whole of theſe ducts, to the number of twelve or fourteen, paſs along the dorſum, towards the anterior extremity of the teſticle, and then emerge and form the anterior part or beginning of the epididymis, which ſome call its head (caput epididymidis) under the name of vaſa efferentia.

The vaſa efferentia unite into one tube, that, admirably convoluted, forms the epididymis; which, at its poſterior extremity, is reflected upon itſelf, and gradually enlarges and tends upwards to the abdominal ring, under the name of vas deferens, and paſſes within the abdomen, and immediately ſinks between the correſponding ſide of the bladder and pelvis, to reach the beginning of the urethra, where it meets with its fellow; they penetrate the urethra, by the ſides reſpectively of a longitudinal eminence, called verumontanum, and caput gallinaginis, on its back part, immediately without the ſphincter of the bladder.

From the teſtes to the abdominal rings the vaſa deferentia are of conſiderable ſize, and can be felt eaſily with the fingers, like ſmall cords; within the rings they become wider, but loſe their firm texture, becauſe they are not ſubjected to much preſſure.

The teſticles receive their blood from the aorta, near the emulgent arteries, through two ſlender arteries, named ſpermatic (indeed the right one generally ariſes from the emulgent artery); they run down divergingly to the rings reſpectively, and reach the epididymides and borders of the teſticles, to which they are minutely diſperſed, for the moſt part, in a ſerpentine manner.

The blood is returned by veins, named ſpermatic, that mount to the rings in various branches that form anaſtomoſes, and called vaſa pampiniformia; which diſpoſition they ſomewhat retain within the rings, in their courſe towards the vena cava, near the kidneys, into which thoſe of the right teſticle end, in one tube; as do thoſe of the left in the left emulgent vein.

From the rings to their terminations, the ſpermatic veins are connected with the arteries of the ſame name, and conſtitute two vaſcular cords behind the peritonæum.

A great number of lymphatic veſſels ariſe from the body of the teſtes and epididymis, and run up with the blood-veſſels to the ring, to paſs through conglobate glands within the abdomen, and join with the reſt of the abſorbent ſyſtem.

The ſpermatic artery and veins, the vas deferens and lymphatic, between the teſticle and ring, are connected by cellular ſubſtance, and form a vaſcular bundle, under the name of ſpermatic cord, which can be readily felt.

The body of the teſtes and greateſt part of the epididymis have two coats.

The innermoſt, which immediately inveſts their ſubſtance, called tunica propria, albuginea, and adnata, is ſmooth and poliſhed on its outer ſurface that reſpects the other coat, named tunica vaginalis; the inner ſurface of the latter is likewiſe ſmooth, ſo that they may glide on each other.

The tunica vaginalis very much reſembles the pericardium. It ſeems to be continued along the cord, but ſo diſpoſed as to leave no cavity betwixt it and the veſſels, although it be ſometimes called the tunica vaginalis of the ſpermatic cord.

In the Myology it is noticed that the cremaſter, derived from the internal oblique, ſurrounds the ſpermatic cord, and terminates in an expanded manner in the exterior and adjacent ſurface of the tunica vaginalis teſtis. In conſequence of this diſpoſition the teſticle can be drawn upwards; a circumſtance that protects the veſſel againſt its weight, and occaſionally contributes to propel the ſemen.

Between the tunica propria and vaginalis teſtis, is the ſeat of the local dropſy, called hydrocele teſtis: this ſometimes acquires vaſt magnitude, ſo as to contain ſeveral pounds of fluid, which is almoſt always tne effect of previous diſeaſe of the teſtis, and eſpecially of its lymphatics; by the coalition of the coats at the epididymis, the fluid is prevented from riſing up within the cord.

Near the openings of the vaſa deferentia into the urethra, there is a cellular proceſs ſent back from each, called veſiculæ ſeminales; they lie along the inferior part of the cervix of the bladder, and reſpectively on the outſide of the vaſa deferentia.

The connection of theſe receptacles with the vaſa deferentia is ſuch, that they may receive the ſeminal fluid by regurgitation, like as the gall-bladder does the bile.

Lying between and covering the extremities of the veſiculæ ſeminales and vaſa deferentia, is a bilobular and ſomewhat triangular gland, named proſtate, that has excreting ducts which open into the urethra, and is of the mucous kind.

This can be felt by the finger in recto, and is entirely or partly cut, in a lateral way, in the lateral operation for the ſtone.

The teſtes and their coats are contained in a bilocular ſac, called ſcrotum, that hangs from the pubes, groins, and anterior part of the perinæum.

Immediately within the integuments of the ſcrotum (which are peculiarly thin) and cloſely adherent to them, is a fine muſcular expanſion, called dartos, that ſeems to be diſpoſed from above downwards, for it corrugates the ſcrotum by drawing it towards the attachment already deſcribed.

The dartos has a complete partition or ſeptum that divides it into two lateral cavities, one for each teſticle.

Between the dartos and the tunicæ vaginales teſtium a very lax cellular ſubſtance is interpoſed, which allows to the teſtes a degree of locomotion, with reſpect to the ſcrotum and one another, that contributes much to their protection.

When ſerous fluid occupies this cellular ſubſtance, it gives anaſarca ſcroti; which is to be careſully diſtinguiſhed from hydrocele teſtis.

On the ſurface of the ſcrotum, running back from the penis to the perinæum, is a prominent line that correſponds to the ſeptum, called raphe, or ſutura ſcroti, that is likewiſe continued to the anus in both ſexes; the latter portion may be named ſutura perinæi.

The

The Penis.

The penis, frequently called membrum virile, is principally made up of three portions of cavernous or cellular ſubſtance; one belongs to the urethra, and may be called portio cavernoſa urethræ; the other two, placed together laterally, are corpora cavernoſa penis.

The cavernous ſubſtance of the urethra begins about an inch from the proſtate gland, under the name of bulb of the urethra, becauſe it is conſiderably thick; of courſe between the proſtate gland and the bulb, the urethra is entirely membranous,

This cavernous covering of the urethra gradually decreaſes towards the middle; but at its extremity it is ſuddenly expanded into a knob, called glans penis: it might be called the anterior bulb of the urethra.

The extremity of the urethra is ſituated on the inferior part of the glans penis, ſo as to have no cavernous below.

The ſuperior extremity of each corpus cavernoſum, ſmall and pointed, under the name crus is attached firmly to the correſponding ramus of the os pubis and iſchium. The two meet and form an acute angle immediately before and under the ſumphyſis pubis, where they acquire their full ſize: they are divided from one another by an imperfect ſeptum, ſo that the cells of the one, from place to place, communicate with thoſe of the other.

The anterior extremities of the corpora cavernoſa, become ſomewhat ſmall, terminate at the root of the glans penis.

Theſe ſubſtances are inveſted by a very firm membranous ſubſtance, common to both; this preſerves their ſhape, and prevents over-diſtenſion.

The cavernous part of the urethra has a proper denſe membranous covering, ſo that no communication exiſts between its cells and thoſe of the corpora cavernoſa; and conſequently the former may be diſtended without the latter, and *vice verſa.*

Blood is carried to the penis by the arteriæ pudicæ internæ chiefly; their extremities communicate with the cells of the cavernous ſubſtance, and thus occaſions the erection or diſtenſion of the penis.

The veins originate, at leaſt partly, from the cells of the cavernous ſubſtance, and return the blood principally to the internal iliac veins; and hence the erection ceaſes. A large ſuperficial branch on the upper part, or dorſum of the penis, is called vena ipſius penis.

A ligament, named ſuſpenſory, connects the beginnings of the corpora cavernoſa to the ſymphyſis pubis.

The common integuments are connected to the ſurface of the cavernous membrane by very looſe cellular ſubſtance; a little behind the glans they form a duplicature, more or leſs extenſive, called præputium, that generally covers the greateſt part of the glans, which below is connected with a longitudinal doubling, that runs to the extremity of the urethra, under the name of frænum.

The integuments of the glans are exceedingly delicate and vaſcular, and, near the præputium eſpecially, abound with ſebaceous or mucous follicles, by ſome called odoriferous glands.

At the orifice of the urethra the integuments are obviouſly inflected, ſo as to form the membranous part of the tube in the way explained.

The integuments in the urethra have many lacunæ that lead to the mucous follicles; their orifices are turned ſlantingly forward.

Theſe pour out the mucus for defence, and are principally affected in gonorrhœa virulenta, and are the chief ſource of the diſcharge.

The glands of the glans are often much affected in the above-mentioned diſorder, and produce the gonorrhœa ſpuria.

The penis derives its nerves chiefly from the ſacral branches; they impart exquiſite ſenſibility to the præputium and glans, particularly the latter.

Conſiderable lymphatic veſſels, that originate from the præputium and glans, run along the dorſum of the penis, to the inguinal glands reſpectively, and thus join with the general lymphatic ſyſtem.

This circumſtance explains the production of bubo, in conſequence of ulcer, called chancre, on the glans or præputium.

It is now obvious that the penis is entirely ſubſervient to the teſtes; in every reſpect calculated to produce a proper emiſſion of ſemen; which can never happen but when a complete diſtenſion or erection exiſts.

The Ovaria.

The ovaria are ſituated, one on each ſide, near the brim, in the extremities of its long diameter.

Theſe organs a good deal reſemble teſticles in their form and other circumſtances; and accordingly were ſo denominated, very generally, by the ancients[*].

They are tied, each by a ſhort ligament, to the bottom of the uterus, and covered by the peritonæum, or lining membrane of the belly.

The covering is ſmooth and unbroken in the young ſubject; but, in the adult, it often exhibits rents, or ſcar-like marks, correſponding to duſky ſubſtances within, named corpora lutea *.

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[*] Caſſeri Tab. Anat, xix. nn. xx. xv. The word Ovarium is not employed by this author.

Veſicles, about fifteen in number, conſiſting of a pulpy membrane, are diſcoverable among the cellular and vaſcular ſubſtance of the ovaria; which, being ruptured, become corpora lutea §.

Blood-veſſels, called ſpermatic, ſimilar in origin, courſe, and form to thoſe ſo named in the male, are beſtowed on the ovaria.

The Uterus.

The uterus, or womb, reſembles a flattened ovoid, and is ſituated more or leſs in the ſuperior axis of the pelvis.

This organ has

1 Fundus, or bottom,
2 Corpus, or body,
3 Cervix, or neck.

The bottom is uppermoſt.

The flattened ſides of the body are turned to the os ſacrum and os pubis reſpectively.

Its edges coincide with the tranſverſe diameter of the pelvis.

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* HALLERI Prim. Lin. Phyſiol. ſect. DCCDLXXVIII.

§ ------------------------------ ſect. DCCDXIXI.-----In ovario etiam teneræ virginis ſedent bullæ rotundæ, membrana pulpoſa firmula, factæ celluloſis fibris; undique ad ovaria adnexæ, qua coagulabili lympha replenter, increto numero, quindecem in uno ovario et ultra, &c.

The cervix, about an inch and half long, is uſually terminated by two eminences, one before and one behind, ſeparated by a tranſverſe chink or rima.

This chink is the orifice by which the uterus communicates with the vagina; the eminences project a little like the ſnout of the tench, therefore ſometimes called os tincæ; but oftener os uteri internum, or internal orifice of the womb, in diſtinction to the external one.

From the middle of the rima a contracted paſſage leads to a ſmall triangular cavity, very limitted in its extent from the fore to the back part, and joins the inferior angle of this cavity.

The ſide oppoſite to this angle correſponds to the fundus.

Each of the other angles is perforated by a uterine tube.

A ſhare of the fore part of the body, the whole of the bottom, and hind part, are covered by the peritonæum.

The anterior portion of its body and neck, not inveſted by this membrane, are in immediate contact with the bladder of urine; a circumſtance deſerving to be well remembered in the detection and management of ſeveral diſeaſes.

The uterus is of conſiderable and pretty equable thickneſs. It conſiſts of

1 A thick membrane, which has been ſuppoſed to be muſcular, interwoven with

numerous blood-veſſels, among which the veins greatly predominate; on this account it has been conſidered as a congeries of veſſels, connected together by cellular ſubſtance *:

2 A lining membrane, more or leſs ſmooth, reflected through the os internum, and continued along the cavities of the uterine tubes.

The uterus is connected looſely to the ſides of the pelvis and adjacent parts, by

1 Ligaments,
2 Cellular ſubſtance.

A doubling of the peritonæum, extending from its edges to the ſides of the pelvis, nearly in the courſe of the tranſverſe diameter are its broad ligaments, or ligamenta lata.

From the lateral points of its bottom, two cord-like ſubſtances, round ligaments, or ligamenta rotunda proceed, one on each ſide, along the brim of the pelvis, to the rings of the abdominal muſcles, through which their extremities paſs a little.

Theſe are in a conſiderable degree vaſcular §; and ſeem to regulate its poſition during the gravid ſtate ||.

The fore part of its cervix is connected with the bladder by cellular ſubſtance.

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* See an elegant Treatiſe de Morbis Peritonæi, by Dr. WALTER, Senior, a very eminent and indefatigable Anatomiſt in Berlin, illuſtrated with two valuable plates of the uterine veſſels.

§ Dionis Chirurgie.

|| Winſlow's Expoſition Anatomique.

In a few caſes this organ has had two cavities, or been double.

Fallopian Tubes.

Theſe go off from the lateral angles of the cavities of the uterus tranſverſely, in a waving manner, each covered or inveſted by a fold of the correſponding broad ligament.

Their terminations, near the brim of the pelvis, are turned ſomewhat back towards the ovaria.

Theſe are trumpet-like, and ſurrounded with a fringe or border, reſembling foliage *, by ſome called morſus Diaboli.

The ſize, at the termination, is equal to that of one of the wing-feathers of the ſmaller birds. It gradually diminiſhes towards the uterus, which it penetrates by a winding courſe.

They are covered by the broad ligaments between the round ones and the ovaria.

I have found them in concretion with the ovaria, and ſometimes impervious.

Vagina Uteri.

This is a tube five or ſix inches long, very capacious and diſtenſible.

The upper extremity, continuous with the ſubſtance of the uterus, embraces the os internum in ſuch a manner that this projects a little, and can be diſtinctly felt by the finger, Accordingly, aſcertaining the ſtate of it is a principal object of touching, or the exploratio obſtetrica.

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* Halleri Faſciculi.

From the os internum, the vagina is continued forwards and downwards, nearly along the inferior axis of the pelvis.

The termination, named external orifice of the womb, or os uteri externum, is ſituated between and almoſt equidiſtant from the anus and arch of the oſſa pubis.

It forms, with the uterus, a very obtuſe angle, almoſt coinciding with the axes of the pelvis *; a circumſtance that makes its poſterior ſide a little longer than its anterior one.

Like the uterus, it conſiſts of

1 A denſe exterior membrane, evidently continuous with that of the uterus at its ſuperior end, and the cutis vera, or true ſkin, at the inferior one; but much leſs vaſcular than that of the former:

2 A lining membrane, continuous with that of the uterine cavity, and with the cuticula or ſcarf-ſkin.

Thus it appears, that the vagina and uterus are productions, or internal proceſſes of the common integuments, under ſpecial modification.

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* Winſlow's Expoſition Anatomique.

The inflection of theſe by the os externum is obvious.

The interior ſurface, during the virgin ſtate, abounds with numerous little eminences, ſeemingly cavernous, which are much altered or obliterated by child-bearing *.

Many glands, of the mucous kind chiefly, are ſcattered along the vagina and cervix uteri, in the latter ſituation, named veſiculæ Nabothi § ; which ſeparate the defending and lubricating fluids.

The connection with the adjoining parts deſerves to be fully marked.

Before, it is in contact with the neck of the bladder, and the urethra through its whole length ; and behind, with the inteſtinum rectum.

Os Externum.

This, ſtrictly ſpeaking, is the inferior part of the vagina ; but the expreſſion is generally regarded as equivalent to pudenda, vulva, or ſinus muliebris.

The os externum begins with the mons veneris, a prominence of the integuments, placed upon the oſſa pubis, and ends about two inches before the extremity of the os coccygis.

Two prominent folds of the integuments,

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* Halleri Faſciculi. This great and ingenious man has paid much attention to the rugoſe or cavernous portion of the vagina.

§ Plenck's Elem. Art. Obſt.

named labia magna, incloſe the ſides of this opening.

These gradually loſe their prominence and ſize as they proceed to the poſterior part of the margin of the vagina.

At puberty the labia and the mons veneris begin to abound with hair.

Between their beginnings is apparent the point of the clitoris, covered more or leſs by a ſemicircular fold of the Integuments, called præputium; both ſomewhat reſemble the penis, and are exquiſitely ſenſible.

Extending from the clitoris backwards, are two ſmall doublings of the integuments, of various length and projection, ſituated within, and generally concealed by the labia magna, called, therefore, labia minora, or nymphæ; they terminate at the anterior part of the vagina, and are very vaſcular.

Between their poſterior extremities, and immediately before the vagina, is placed the orifice of the urethra, or paſſage of the urine, a tube continued from the bladder, ſomewhat more than an inch long, and equalling a ſwan's quill in capacity.

At each ſide of the orifice of the urethra is a conſiderable mucous lacuna.

Behind the urethra, and in contact with it, is the orifice of the vagina, or, in a ſtrict ſenſe, the os externum.

This opening is narrowed, generally till the ſexual commerce has taken place, by the hymen,

men, a membranous border, or doubling of the integuments, of a ſemilunar or circular form *; its fragments are carunculæ myrtiformes.

The whole of the os externum is extremely delicate, exceedingly vaſcular, and copiouſly ſtored with mucous and other glands, that furniſh fluids for protection.

The interſtice between the os externum and anus, about an inch long, is perinæum.

This is ſubjected to great diſtenſion during parturition.

A cavity between the vagina and perinæum is foſſa navicularis; this is bounded laterally and behind by the fourchette §, which is ſeemingly ligamentous.

The vagina is connected to the bottom of the pelvis by a muſcle, called levator ani; and to the anus and os coccygis by another, named ſphincter ani: a continuation of this laſt, on each ſide of it, is conſtrictor cunni.

The Gravid Uterus.

The uterus is gravid when it contains the embryo, fœtus, or child.

This ſtate is termed gravidity, pregnancy, and utero-geſtation.

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* HALLERI Faſciculi.

§ SMELLIE's Midwifery.

In proportion as the child acquires bulk, the uterus is diſtended in all its dimenſions; it ſtill, however, preſerves its former ſhape [*].

The bottom, as pregnancy proceeds, riſes gradually above the brim of the pelvis, following nearly the direction of the axis.

By the fourth month it exceeds the oſſa pubis [§], and at laſt reaches conſiderably above the umbilicus, puſhing upwards and aſide the adjacent bowels.

The round ligaments, put ſomewhat on the ſtretch, regulate the poſition of its bottom in this elevated condition [||].

The ovaria are drawn from their uſual reſidence within the pelvis.

The cervix is gradually raiſed and ſhortened, and its cavity proportionally widened; at laſt the prominences bounding the os internum are totally effaced.

During this change the thickneſs is not much diminiſhed; the ſubſtance, however, becomes lax and ſpongy, and its veſſels much enlarged; a condition ſomewhat reſembling that which the common integuments acquire when gradually diſtended by tumour.

The fleſh-like appearance of the uterine ſubſtance has induced ſome authors to conſider it as a muſcular organ * ; an idea by no means to be readily credited, becauſe it is repugnant to

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[*] ALBINI Tabulæ.
ROEDERERI Tabulæ.
HUNTER's Gravid Uterus.

[§] PLENCK's Elem. Art. Obſt.

[||] DIONIS' Chirurgie.

1 Appearance in the unimpregnated ſtate,
2 Function,
3 Analogy §.

The Child.

The fœtus has the following ſpecialities:

1 Umbilical chord,
2 Placenta,
3 Membranes,
4 Liquor amnii,
5 Urachus,
6 Foramen ovale,
7 Ductus arterioſus,
8 Canalis venoſus,
9 Unexpanded lungs,
10 Membrana pupillaris.

Umbilical Chord.

The umbilical chord, or funis umbilicalis, conſiſts chiefly of

1 Two arteries,
2 One vein.

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[*] Dr. HUNTER's Gravid Uterus.

[§] See Dr. WALTER's Treatiſe, before quoted, in which he denies the exiſtence of muſcular fibres, and ſupports his opinion by many ingenious arguments.

The arteries are direct productions or continuations of the hypogaſtric or internal iliac ones reflected, one on each ſide of the bladder. Running before the peritonæum, they gradually approach one another at the umbilicus (navel) which is a ring.

Theſe arteries, at the umbilicus, are in contact, paſs through it, and proceed ſpirally along the chord, which is about two feet long, to its termination in the placenta; in which they are ſuddenly and minutely ramified.

The vein originates from the placenta at that part where the arteries enter it, and returns ſpirally to the umbilicus.

This large veſſel paſſes through the umbilical ring, and is continued in an upward direction, before the peritonæum, to a cavity in the inferior ſurface of the liver, named ſinus portarum, where it joins the trunk of the vena portarum.

Theſe three veſſels (the number is ſeldom varied) are connected by cellular matter, and covered by the integuments hereafter deſcribed.

Placenta.

The placenta, or uterine cake, is a vaſcular maſs, more or leſs circular, thickeſt in the middle, convex and lobular on the ſurface turned to the uterus, while it is ſlightly concave, or nearly plain on the oppoſite ſide.

It is chiefly formed by the minute ramifications of the umbilical arteries and veins, which appear beautifully ſerpentine and prominent on the ſurface correſponding to the chord.

The lobes, or ſubdiviſions, correſpond to the trunks of their veſſels, by which they are formed.

By maceration they get the appearance of fine fringes or bruſhes.

The placental veſſels and their lobes are connected by cellular matter, which pretty completely covers, as with a lamina, the uterine ſurface of it.

By the injection of proper fluids, particularly quickſilver, the rout and motion of the blood in it can be imitated fully.

Membranes.

Theſe form the cyſt in which the child is incloſed, and reſemble a diſtended bladder, accurately filling the uterine cavity. Theſe are two,

1 Chorion, which is outermoſt, and conſequently is in contact with the uterus.

The adheſion to the uterus, which is ſlender, is formed by a cellular ſubſtance, which has been named ſpongy chorion *; and even regarded as a diſtinct covering, derived from the uterus, under the appellation of membrana decidua, and membrana decidua reflexa *.

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* HALLERI Elem. Phyſiolog.

This cellular ſubſtance never contains any fat or oil, and is evidently continuous with that of the reſt of the body, in the ſame manner as the umbilical veſſels are with the others.

The like continuity is to be remarked between the chorion and cutis vera, or true ſkin.

The placenta lies on the outſide of this membrane, to which it cloſely adheres.

2 Amnios, which is innermoſt, comparatively thin, and is in contact with the chorion, to which it adheres through its whole extent, by means of a very fine cellular ſubſtance.

It is a continuity of the cuticle or ſcarfſkin.

Thus it appears that theſe membranes are a part of the integuments, and that the placenta and umbilical veſſels are a part of the vaſcular ſyſtem. They are indeed temporary and caducous, but analagous in this particular to ſome of the other parts, the teeth, the hair, &c.

The fœtus, thus conſidered, is a complete œconomy, and may juſtly be ſaid to be totus in ſe atque rotundus.

The placenta and membranes together are frequently called (ſecundinæ) ſecundines, after-birth, and after-burthen (l'arriere faix).

Theſe are rudimental parts.

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* Dr. HUNTER's Gravid Uterus.

Spallanzani, that ingenious and acute naturaliſt, has ſeen them in form of a pellucid veſicle in eggs, before fæcundation and incubation *.

They ſeem to be as eſſential to the growth of the animal as the root is to that of the vegetable.

The fœtus has been conſidered as an ovum or egg §. The analogy either does not exiſt at all, or is not cloſe.

The chorion and amnios, delicate and pellucid, in general are eaſily torn.

Their blood-veſſels muſt be ſmall.

No nerves nor abſorbents have been diſcovered in them.

Liquor Amnii.

This, commonly called waters, completely fills the cavity of the amnion.

It is in various quantity, and exceedingly mild; and ſeems to be a ſecretion from the child obviouſly intended for protection and facilitating parturition.

Urachus.

This is a tube that goes directly from the bottom of the bladder, between the umbilical arteries, and becomes impervious before it reaches the navel.

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* Diſſertations relative to Natural Hiſtory, vol. ii. p. 56. 159.

§ Smellie's Midwifery.

Foramen Ovale.

This is a large hole, provided with a valve, in the partition of the auricles of the heart.

Ductus Arterioſus.

This is a ſhort tube, forming a paſſage from the pulmonary artery to the aorta.

Canalis Venoſus.

This tube ſtretches between the ſinus venae portarum and vena cava.

Unexpanded Lungs.

The lungs, unexpanded and comparatively heavy, ſink in water before reſpiration takes place.

It does not follow that the ſwimming of the lungs, or their being lighter than water, is an infallible mark that the child to which they belonged had been born alive; although the contrary is full evidence that reſpiration had not taken place.

Attention to this circumſtance is of high importance in the anatomia forenſis, or judicial anatomy.

Membrana Pupillaris.

This is a delicate film in the pupil *.

Form of the Fœtus.

This is pyramidal; the head, being of greateſt circumference, is the baſe of the pyramid.

The trunk and limbs may be tranſmitted through any opening by which the head has paſſed.

Situation of the Fœtus.

The bulk of the head ſeems to be inverſely as the age, and always bears a great proportion to that of the other parts, and may be a chief cauſe of its being very conſtantly turned downwards, or preſented to the os internum.

The abundance of the liquor amnii, during early pregnancy, favours the gravitation of the head (hence it is turned downwards very generally); and permits the twiſting or entangling of the chord about the neck or limbs, and, what is more remarkable, the knotting of it.

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[*] Dr. GERRARD of Liverpool, my ingenious friend, has lately publiſhed an inaugaral diſſertation, in which the above, and other circumſtances of diſcrimination of the fœtus, are accurately treated.

Structure of the Skull at Birth.

The oſſification of the ſkull being incomplete, allows it to change ſhape according as it is preſſed, and thus favours parturition.

Form of the Head.

The human brain, and conſequently the head, is of an egg-like ſhape.

The forehead is the ſmall, and the hindhead the great extremity.

The long axis ſtretches from the one extremity to the other; and the ſhort one, cutting this at right angles, extends from ear to ear.

The Thorax.

The oſſeous and containing parts of the thorax or cheſt have been already deſcribed in the Oſteology and Myology.

The Pleuræ.

The cheſt is lined and its contents covered by two membranes, called pleuræ, nearly in the ſame manner as the abdomen and its viſcera are by the peritonæum.

The pleura is a ſimple lamina; its external ſurface is connected to the contiguous parts by cellular ſubſtance, while the internal ſurface is ſmooth and gliſtening.

The pleuræ may be conſidered as two bladders, lying longitudinally within, and filling the cheſt, and forming two cavities that may be called pleuritic.

The partition of theſe cavities conſiſts of the touching laminæ of both pleuræ, and extends between the ſpine and ſternum, under the name of mediaſtinum; and its portions are called poſterior and and anterior, according to ſituation.

It will be underſtood that the heart, covered by the pericardium, and the thoracic portion of the great veſſels, &c. lies between the mediaſtinal laminæ, and of conſequence without the pleuræ.

The anterior mediaſtinum ends before the pericardium; of courſe a part of this membrane lies naked immeditaely behind the inferior extremity of the ſternum, and therefore may be opened, when dropſical, through a trepanned hole of the point of the ſternum, without wounding the pleuræ.

The pleuræ covers the upper ſurface of the diaphragm, except the tendinous portion that is attached to the pericardium, as deſcribed.

It will be underſtood that the pleuræ cover the whole of the internal ſurface of the ribs, and internal intercoſtal muſcles, under the name of coſtal pleuræ.

The pleuritic membranes are not obſcurely ſenſible, and not much vaſcular. They have been ſuppoſed to be the ſeat of the inflammation called pleuriſy (pleuritis).

The Thoracic Viſcera.

Beſides the heart and great veſſels, the thoracic viſcera are,

1 The lungs,
2 The thymus,
3 The œſophagus.

The Lungs.

The lungs (pulmones) are a ſpongy ſubſtance of great volume, divided into right and left portions (of which the firſt is largeſt); they occupy the whole of the pleuritic cavities, ſtill, however, on the outſide of the pleuræ, by which they are covered; and theſe membranes are ſo far called pulmonary pleuræ.

Sciſſures, more or leſs deep, divide the lateral portions of the lungs into lobes, of which there are generally ſix.

The ſubſtance of the lungs is almoſt entirely vaſcular; for it conſiſts of,

1 Air } veſſels,
2 Blood } veſſels,
3 Lymphatic } veſſels,

connected by cellular ſubſtance, and covered by the pleuræ; which laſt fix them to the ſpine, under the name of ligaments of the lungs.

Air Veſſels.

The lungs are truly a pneumatic organ, becauſe principally made up of proper air-veſſels, of which there are none elſe in our bodies.

The trunk of the air veſſels is chiefly cartilaginous, and extends from the os hyoides to the heart, under the name of trachea, and aſpera arteria.

The trachea, from its beginning to the ſternum, is very ſuperficial, and can be readily felt on the fore part of the neck.

The upper part, conſiſting of five cartilages, deſcribed in the Myology, is the largeſt, and is called larynx, and by ſome pomum Adami.

The trachea conſiſts principally of imperfect cartilaginous rings (their deficiencies are behind, and correſpond to the diaphragm) connected by ligaments; the firſt adheres to the cricoid cartilage.

Behind, and almoſt oppoſite to the baſe of the heart, the trachea divides into two branches, one to each lateral portion of the lungs, which enter the roots of the lobes, and are ſuddenly and minutely ſubdivided.

After the trachea is ſubdivided, it gradually loſes its cartilaginous ſtructure, and takes the name of bronchia.

The extremity of each bronchial branch is connected with numerous veſſels or cells, all communicating with one another, that form a lobule more or leſs angular.

The pulmonary lobules are exceedingly numerous; indeed they are almoſt the whole of the lungs; for the blood and lymphatic veſſels are principally diſperſed in their interſtices.

A cluſter of theſe lobules, correſponding to a bronchial branch, makes up one of the lobes.

It will be underſtood, that air blown into the trachea inflates the whole of the lungs; that, when thrown into one of the primary branches, it only diſtends the correſponding lateral portion; that, when injected into a ſecondary branch, it fills a lobe; and, when into an ultimate one, a lobule.

Thus it appears that there is no communication between the cells of one lobule and thoſe of another, but through the bronchial tubes: an admirable artifice intended by Nature to contribute to our preſervation from many diſeaſes.

The common integuments from the mouth, having covered the epiglottis, paſs down through the glottis, and, by means of two tranſverſe ligaments extended between the thyroid and arytenoid cartilages, form a receſs on each ſide, under the name of ventricles of the larynx: they are continued ſo as to line not only the trachea but the bronchia, and perhaps form the cells, ſo that the air or matter in them is on the ſurface of our bodies.

Theſe pulmonary or bronchial integuments abound with glands which prepare the protecting mucus, and are often morbidly affected.

Blood Veſſels.

The pulmonary artery, it has been obſerved in the Angiology, immediately after it has got beyond the pericardium, divides into two great primary branches; theſe take a direction to the lateral portions of the lungs reſpectively, and are ſubdivided into ſecondary ones that correſpond to the lobes, which are ſuddenly and minutely ramified, ſo as to be copiouſly diſperſed on the ſurface of the cells, into which many exhalant branches would ſeem to open, and which perhaps emit the halitus and the mephitis or phlogiſton, that eſcape with the air in expiration.

The extreme pulmonary arteries (the exhalant branches excepted) are reflected, and become veins; which, uniting from point to point, form trunks, two on each ſide, that end in the left auricle of the heart, under the name of pulmonary veins.

The courſe of the pulmonary arteries and veins among the lobules is nearly the ſame.

It was formerly mentioned, that ſmall arteries, under the name of bronchial, ariſe from the aorta, enter the lobes, and are diſperſed for the purpoſe of nouriſhing the lungs, or becoming vaſa vaſorum.

It will be underſtood, that as the bronchial ſurface is of great extent, and the extremely numerous pulmonary veſſels are ſpread on that ſurface, that the air in the cells and the blood in its veſſels are almoſt in mutual contact.

Lymphatic Veſſels.

The pulmonary lymphatics are exceedingly numerous.

They originate from the air veſſels and the cellular ſubſtance, and tend towards the roots of the lobes, and edges of the lateral portions of the lungs; and then paſs through conglobate glands, and, it would ſeem, terminate in the thoracic duct.

In this courſe ſome of theſe veſſels are ſuperficial, and are eaſily perceived and injected with air, mercury, &c.

There are probably numerous conglobate glands in the lungs, through which theſe veſſels paſs.

The lungs derive their nerves from the pulmonary plexus, &c.

After reſpiration or breathing has taken place the lungs become fully dilated, and fill the pleuritic cavities completely; ſo that the pulmonary and coſtal portions of the pleuræ are in contact, and the former glides ſomewhat on the latter.

This contiguity, in conſequence of inflammation, produces adheſion or concretion, which are very frequent; a circumſtance carefully to be attended to by the ſurgeon about to perform the operation called paracenteſis thoracis.

The Thymus.

This is a maſs, ſeemingly glandular, ſituated in the upper and anterior part of the cheſt, between the pleuræ, and of courſe above and ſomewhat before the pericardium.

It is much greater in the young than old ſubject; a circumſtance ſomewhat common to all the glands.

No excreting ducts have been diſcovered.

The Oeſophagus.

The œſophagus, or gullet, may be conſidered as the beginning of the alimentary tube: it extends from the pharynx (the muſcular part of which is already deſcribed) to the cardiac orifice of the ſtomach, immediately before the bodies of the adjacent vertebræ, and behind the trachea and pericardium; and between the pleuræ in the poſterior mediaſtinum.

This tube enjoys the inteſtinal ſtructure: its muſcular coat is peculiarly thick, evidently to enable it to puſh the morſel downwards with due celerity. It is to favour this action that the poſterior part of the bronchial cartilages is deficient.

As the pharynx, or beginning of the œſophagus, and fauces, conſtitute one cavity; it is eaſy for the ſurgeon to introduce the probang or flexible probe, ſo as to extrude the morſel or other ſubſtance impeded in it, and producing proportional ſuffocation.

Upon occaſion, not only probes but injecting tubes may be paſſed along the œſophagus to the ſtomach, for various purpoſes.

Theſe circumſtances deſerve to be well recollected.

The Eye.

The eye-balls (bulbi oculorum) the organs of viſion, ſituated in the orbits, are of exquiſite mechaniſm; they are nearly ſpherical, and conſiſt of membranes, called coats (tunicæ) and humours (humores).

The coats are,

1 Conjunctiva,
2 Albuginea,
3 Sclerotica,
4 Choroides,
5 Retina.

The humours are,

1 Aqueus,
2 Cryſtallinus,
3 Vitreus.

Tunica Conjunctiva.

This conjunctive coat is partial: it only covers the anterior ſurface of the eye-ball.

It ſeems to be nothing other than the common integuments continued from the interior ſurface of the eye-lids. It prevents air, &c. from being inſinuated unduly backwards.

This coat is very vaſcular and ſenſible, like the integuments, under every modification; hence pain and redneſs (ophthalmia) when irritation is applied to it.

Tunica Albuginea.

This lamina, commonly called the white of the eye (albugo oculi) ſeems to be an expanſion of the tendons of the ſtraight muſcles, and extends from where they touch the eye-ball to the circle in which the white ends.

Tunica Sclerotica.

The ſclerotic coat is the moſt ſubſtantial and extenſive, and principally prevents alteration of the ſhape of the eye-ball.

On account of an obvious difference of ſtructure it is divided into two portions, named opaque and pellucid.

The opaque portion (ſclerotis opaca) is the poſterior and largeſt, and ſeems to be continuous from the inner lamina of the dura mater, that covers the optic nerve; its back part is thickeſt.

Where the opaque portion ends the pellucid one, commonly called cornea (ſceloris pellucida) begins, and completes the incloſure: it reſembles a ſegment of a ſphere, ſmaller than the eye-ball, applied on its anterior ſurface, and hence is ſomewhat prominent.

It is covered by the tunica conjunctiva, but not by the albuginea.

Tunica Choroides.

The choroid coat, of a brown colour and leſs ſubſtantial than the ſclerotis, is perhaps derived from the pia mater, and, like it, conſiſts of two laminæ; the interior one has been called membrana Ruyſchiana.

The choroides adheres looſely to the ſclerotis, except at the diviſion of the pellucid and opaque portions, where the adheſion is cloſe, and named ciliary circle (orbiculus ciliaris); and when ſeparated a white line appears.

The ſegment of the choroid coat, anterior to the ciliary circle, leaves the pellucid cornea and forms a perforated partition in the cavity of the eye-ball; the anterior ſurface, being variegated, is called iris; and the poſterior one uvea; and the hole, which is accurately round, is the pupil (pupilla).

Behind the uvea, and nearly correſponding to the orbiculus ciliaris, are numerous duplicatures of the membrane of Ruyſch, called ciliary proceſſes (proceſſus ciliares) which, gradually becoming leſs prominent as they proceed backward, ſoon diſappear; they are diſpoſed like rays, and form a circle, which has been called improperly ciliary ligament (ligamentum ciliare).

In the fœtus a delicate membrane fills the pupil, under the name of membrana pupillaris.

The pupil is occaſionally contracted and dilated, probably by muſcular fibres, ſtill, however, preſerving its circular form.

Tunica Retina.

The retina, ſo far from being a coat of the eye-ball, is the eye itſelf, or the immediate organ of viſion; and to it all the other coats and parts are accordingly ſubſervient.

The retina, derived from the optic nerve, which enters the eye-ball in a point not exactly oppoſite to the pupil, is a delicate mucus-like expanſion which adheres to the interior ſurface of the choroides, and ends at the ciliary proceſſes.

A ſmall tubercule, correſponding to the axis of the optic nerve, can be marked from which the retina ſeems to originate ; this is inſenſible to light.

Thus it ſeems probable that the ſclerotis, choroides, and retina are nothing other than an expanſion of the optic nerve, admirably ſuited to its function.

Humor Vitreus.

The vitreous humour, tranſparent, and about the conſiſtence of the white of an egg, occupies about four fifths of the eye-ball, and is backmoſt ; ſo that its anterior ſurface, which has a ſmall depreſſion in its middle, nearly coincides with the plane of the ciliary circle.

A delicate membrane, ſeemingly of two laminæ, ſurrounds the vitreous humour, under the name of capſule ; the exterior one is in contact with the retina throughout, while the interior one is ſuppoſed to form ſepta, and conſequently cells, in which the humour is lodged ; hence the whole has been called vitreous ſubſtance (ſubſtantia vitrea et corpus vitreum).

Humor Cryſtallinus.

The cryſtalline humour is pellucid, and more conſiſtent than the vitreous one, to which it bears a very ſmall proportion : its form is lenticular, hence it is commonly called the cryſtalline lens (lens cryſtallina).

The cryſtalline lens is partly lodged in the depreſſion in the anterior ſurface of the vitreous humour mentioned, conſequently it is in the axis of the eye ball, and immediately behind the pupil, through which, eſpecially when its pellucidity is diminiſhed by diſeaſe, it can be ſeen.

The lens is inveſted with a capſule, formed, as would ſeem, by the two laminæ of the vitreous capſule receding from one another, ſo that the interior one is behind, and the exterior one before the lens: by this diſpoſition a ſmall triangular ſpace, as is alledged by Petit, exiſts around its margin, containing a little watery fluid; hence named canalis Petitianus.

Around the exterior capſule of the vitreous humour, by ſome called membrana hyaloidea, and correſponding on one ſide to the canalis Petitianus, and on the other to the ciliary ligament, is a circle of radiated duſky lines cauſed by the ciliary proceſſes, which at leaſt are in contact with the capſule, collectively named zona ciliaris.

The lens, it would appear, conſiſts of laminæ, peculiarly diſpoſed and variouſly denſe, a circumſtance that prevents an artificial one from fully anſwering the purpoſe of the natural one.

The lens is a good deal ſpherical in the fœtus, but afterwards becomes conſiderably compreſſed, and ſomewhat ſtraw-coloured.

A loſs of pellucidity, to a certain degree, is a diſeaſe called cataract.

Humor Aqueus.

The aqueous humour is very ſimilar to water, and fills what of the anterior part of the cavity of the eye-ball is not occupied by the others; conſequently it touches the pellucid cornea before, and the anterior ſurface of the capſule of the lens behind; and is divided into two portions by the uvea, which communicate through the pupil: of theſe the foremoſt is ſaid to be in the anterior, and the other in the poſterior chamber of the aqueous humour (cameræ anterior & poſterior humoris aquei).

It will be underſtood, that the quantity of the aqueous humour is greater than that of the cryſtalline one, and that it has no proper capſule, becauſe this would interfere with the motion of the uvea, or contraction of the pupil.

Theſe humours are unqueſtionably prepared by a ſecreting act of the effuſing veſſels; and, to counterbalance abſorbtion and diſſipation, a conſtant renewal becomes neceſſary.

The aqueous humour is ſuddenly reſtored, even after a total loſs; while an effuſion, not very great, of the vitreous one is irreparable: a circumſtance that ought to be well known to the oculiſt.

Many of the branches of the ophthalmic artery, that enter the ſclerotic coat from point to point, reach the choroid one, and ramify on it in all directions, under the name of vaſa vorticoſa; at leaſt, the correſponding veins have this vorticoſe diſpoſition.

The central branch of the laſt-named artery that runs in the ſubſtance of the optic nerve, and correſponds to the tubercule or punctum non videns, ſends arteries to the choroid coat, retina, and humours.

The arteries of the anterior part of the choroid coat anaſtomoſe ſo as to form a circle near the orbiculus ciliaris, from which the iris, &c. is ſupplied with branches, called ciliary arteries.

The blood is returned by the ophthalmic veins to the external jugulars.

The vaſcular condition of the eye-ball is manifeſted by profound ophthalmia, and anatomically by injections; in conſequence of which the parts become almoſt entirely red.

The nerves that enter the orbit, particularly the third pair and firſt branch of the fifth, form the ganglion ophthalmicum; from which branches are propagated to the various parts of the eye-ball, and impart ſenſibility and motion; but ſeeing entirely depends upon the optic nerves modified into the retinæ.

The rays of light that fall on the pellucid cornea are tranſmitted and refracted by the humours, ſo that the focus or picture is formed that touches more or leſs exactly the retina, and gives the ſenſation that we call ſeeing, or viſion; the perfection of which entirely depends on that of the mechaniſm.

It has been obſerved that an opacity of the cryſtalline lens is called cataract; which, it will be underſtood, diminiſhes viſion, by intercepting the rays of light.

Surgery propoſes to remove the cataract by,

1 Depreſſing or moving it from the axis of the eye-ball, ſo as to allow the rays to be tranſmitted; an operation commonly called couching the cataract:

2 Extracting it from the eye-ball altogether through the pupil, and through an inciſion of the pellucid cornea; an operation called extraction of the cataract:

3 Wounding it, without depreſſing or extracting, to procure its ſolution and diſappearance; an operation named detrition of the cataract.

As there is not ſufficient ſpace in the poſterior chamber of the aqueous humour to hold the diſplaced cataract, it ſeems to be proper, in couching, to lodge it in the vitreous humour, by the couching needle paſſed a little behind the uvea, and managed with ſuch caution as to preſerve the anterior lamina of the cryſtalline capſule entire.

The inciſion of the pellucid cornea, for extraction, ought to be equal to half its circumference, and parallel and near to the ciliary circle; and performed ſo as to preſerve this and the iris from injury.

The lens is expelled by cautious preſſure on the eye-ball, after wounding the anterior lamina of its capſule; and, when well done, the poſterior one is entire, and no part of the vitreous humour is effuſed. This ſtep of the operation is exceedingly delicate.

It has been obſerved already, that a total derangement of the eye-ball is the neceſſary conſequence of a conſiderable effuſion of the vitreous humour; hence the great importance of not wounding its capſule.

The ſurgeon, before he attempt theſe operations, ought to be well acquainted with the parts.

The eye-ball has a great variety of ſubſervient apparatus:

1 Muſcles,
2 Eye lids,
3 Glands,
4 Lachrymal paſſages.

Muſcles.

The muſcles of the eye-ball and eye-lids, amounting to eight, have been deſcribed in the Myology.

The Eye-lids.

Each eye-ball has two lids (palpebra ſuperior et inferior) that, like a ſphincter curtain or valve, ſhut or cover it when we are ſaid to wink; theſe form two angles (canthi) one external, next the temples, and one internal, and greateſt, next the noſe.

The upper eye-lid is largeſt, and poſſeſſes the greateſt quantity of motion; ſo that the eye is principally ſhut by its moving downwards.

Each eye-lid is chiefly formed by a ſemilunar concave cartilage, named tarſus.

The ſtraight edge of the tarſus of the upper eye-lid is turned towards that of the under one; they mutually touch, by their outer margins, when the eye is ſhut; ſo that a triangular gutter is formed between them and the eye-ball, to allow the tears to glide towards the internal angle.

The poſterior edges of the tarſi are tied to the brim of the orbit, by means of membranes that ſeem to be productions of the perioſteum.

It has been mentioned in the Myology, that the levatores muſcles of the eye-lids are attached to the poſterior edges of the upper tarſi; and that to them the upward motion of the upper eye-lids is to be aſcribed.

It has alſo been mentioned, that the orbicularis palpebrarum is ſpread over the tarſi, and, like a ſphincter, ſhuts the eye by moving both eye-lids.

The common integuments are obviouſly inflected through the opening of the eye-lids, under a change of modification, ſuch as is to be obſerved in their other inflections; and thus line the inſide of the tarſi, and cover the anterior part of the eye-ball, under the name of tunicæ conjunctivæ, as explained.

A particular ſpecies of hairs, arranged in rows, is implanted in the external edges or prominent angles of the touching margins of the eye-lids, and are called eye-laſhes, or cilia.

Glands.

The pellucidity of the cornea, and mobility of the eye-ball could not be preſerved without protecting and lubricating fluids, which are afforded by,

1 Glandula lachrymalis,
2 Glandula innominata,
3 Glandulæ Mybomii.

The glandula lachrymalis is ſituated within the orbit, in the depreſſion, near the external angular proceſs of the frontal bone, mentioned in the Oſteology.

This gland, which is of the compound or conglomerate kind, is about the ſize and form of a ſmall flattened hazel nut; it ſeems to produce ſeveral excreting ducts, that open on the lining membrane of the upper eye-lid, and pour out the watery liquor, commonly called the tears, which is continually and uniformly ſpread over the conjunctive coat by the motion of the eye-lid: a circumſtance eſſential to its luſtre; hence the dull and glazed eye of the ſick and dead.

This gland is ſo ſituated that it may be cut out, when diſeaſed, without wounding the tunica conjunctiva.

Glandula innominata, or caruncula lachrymalis, is a ſmall maſs that makes a prominence in the internal angle of the eye-lids, and is diſtinguiſhed by a fold of the tunica conjunctiva between it and the eye ball: ſmall hairs can be obſerved growing from it.

This gland ſeems to be of the mucus or ſebaceous kind, and its liquor intended to protect the angle and prevent the tears from overflowing in certain attitudes.

Glandulæ Mybomii are numerous, and ſituated between the tarſi and lining membrane of the eye-lids; they reſemble white lines, and each has a ſmall orifice near the roots of the cilia, from which a ſebaceous or unctuous matter is effuſed.

Theſe glands are the ſeat of the ſwelling and inflammation, called hordeolum and commonly the ſtye.

Lachrymal Paſſages.

The channels by which the tears are conveyed from the eye to the noſe are named lachrymal paſſages (viæ lachrymarum).

The lachrymal paſſages are of unequal capacity in different parts: they begin by a ſmall round orifice in the margin of each eyelid, near the internal canthus, called puncta lachrymalia: they can be eaſily ſeen in oneſelf.

From the puncta lachrymalia two ſlender tubes, named lachrymal canals, proceed convergingly to the orifice of the oſſeous paſſage, deſcribed in the Oſteology, where they unite, and are ſuddenly expanded into what is called the lachrymal ſac (ſacus lachrymalis); from which a contraction or tube leads down to the noſe, under the name of lachrymal duct (ductus lachrymalis): its extremity is not wider than the cavity of a crow's quill.

The common integuments, inflected by the puncta, variouſly expanded and joining with thoſe of the noſe, form the lachrymal paſſages.

It is highly conſequential to the ſurgeon to be well acquainted with theſe paſſages; as not unfrequently they become diſeaſed and obſtructed, and produce much inconvenience; particularly that kind of ulcer, named fiſtula lachrymalis.

It is obvious they may be injected by various ſubſtances, from each extremity, with a view to render them pervious *.

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* I ſuggeſted the idea of injecting quickſilver into theſe paſſages, in the ſame manner as we do into ſmall veſſels, for anatomical purpoſes (ſee Syſtematic Elements of Surgery). In two years afterwards my acquaintance Mr. BLIZARD executed it. See Philoſ. Tranſ.

When the duct is obſtinately obſtructed a perforation is made from the ſac, ulcerated or previouſly opened, through the os unguis into the naſal cavity, between the oſſa ſpongioſa, to be preſerved as a new paſſage; this is the operation for the fiſtula lachrymalis, which is not a little troubleſome and precarious.

In general it may be aſſerted, that it is the ſafeſt method to conſolidate the ulcer, and neglect the perforation.

The Ear.

The organ of hearing, as mentioned in the Neurology, is formed by the portio mollis of the ſeventh pair of nerves, expanded principally in the cavity named tympanum, deſcribed in the Oſteology.

The tympanum is ſeparated from the external ear (meatus auditorius externus) by a perfect membranous ſeptum or partition, called membrana tympani, that can be ſeen, in ſitu, in a good light.

The meatus auditorius is partly oſſeous and partly cartilaginous, as noticed in the Oſteology.

The external orifice is very conſiderably expanded, as every one knows, in a backward direction; and has ſlender muſcles to communicate motion, which generally have a very obſcure action in the human kind.

The integuments, after covering the expanded orifice of the ear, are inflected, and line the tubular part of the paſſage, and terminate upon the membrana tympani, and conſtitute its external part; ſo that the lining of the paſſage may be compared to the integuments of the finger inverted.

The integuments of this meatus abound more or leſs with hair and glands, that may be called ceruminous; becauſe they ſeparate the protecting matter, called cerumen, or ear-wax.

There is reaſon to conclude, that a morbid ſtate of theſe glands gives a running of matter, called by ſome otirrhæa, that ſometimes is of a purulent appearance.

Behind the ears numerous ſebaceous glands are ſituated, that give a glazed appearance to the ſurface by the diffuſion of their liquor, which has a particular odour; and, in the child, are often obſerved to give a diſcharge that ſeems to be purulent.

The cerumen becomes ſometimes unduly abundant and indurated, and conſequently cauſes deafneſs, by hindering the undulations of air, that excite the ſenſation of ſound, from touching the membrana tympani: this can be ſeen, and may be removed by probes, or injection dexterouſly performed.

From the tympanum the Euſtachian tube or paſſage extends inwards and forwards, and ends near the correſponding poſterior opening of the noſe by a cartilaginous orifice, nót a little reſembling the external ear in miniature.

The integuments from the noſe and fauces are inflected through the orifices of the Euſtachian tubes, and cover the tympana, the bones they contain, and the other cavities, and form the inner ſurface of the membrana tympani, which thus probably conſiſts of four laminæ.

The cartilaginous orifice preſerves it open, which ſeems to be a circumſtance neceſſary to diſtinct hearing; and it will be recollected, that ſuch is its ſituation with regard to the noſe, that a probe or tube, properly curved, may be introduced into it with a view to render it pervious when obſtructed by mucus, or the like.

The Noſe.

The noſe is a very conſiderable cavity, formed by the bones of the face, as appears from the Oſteology; of which the openings before and behind are named noſtrils.

The anterior noſtrils are completed by at leaſt four cartilages, which have, by their elaſticity, an excellent effect to elude violence.

Through the anterior noſtrils the common integuments are inflected, and line the whole naſal cavity with its ſinuſes and cells, under the name of Shneider's membrane (membrana Shneideriana); and through the poſterior ones are continuous with thoſe of the fauces.

It was noticed in the Neurology, that the firſt pair of nerves, having deſcended through the holes of the ethmoid bone, became the organ of ſmelling, and hence the name.

For this purpoſe the olfactory nerves are expanded under very delicate and ſpecial modification, principally in the upper part of the naſal cavity, and interwoven with the naſal integuments.

The lining membranes of the noſe are obviouſly very vaſcular: their numerous arteries are derived from the external carotids; hence hæmorrhage from this ſurface (epiſtaxis) often happens; and not ſeldom relieves or prevents diſeaſe in the head, &c. depending on plethora.

When the epiſtaxis is ſo abundant as to require to be ſuppreſſed, it has been propoſed to plug up the noſtrils, which is a very practicable idea.

The ſuperior portion of the naſal membrane is much covered with glands that furniſh the mucus or pituita; on this account by ſome named pituitary membrane.

It is not improbable that the polypus, often met with in the noſe, is an induration and tumour of one or more of theſe glands, ſomewhat in the ſtile of ſchirrus.

Hairs are implanted in the anterior noſtrils, of ſuch form and diſpoſition as to prevent the admiſſion of the more palpable matters, with the air, in inſpiration.

It has been already mentioned, that the frontal ſinuſſes, communicating with the ethmoidal cells, open into the ſuperior part of the naſal cavity; and the ſphenoidal ones above and behind; and the maxillary ones laterally.

Theſe laſt have their orifices ſituated between the oſſa ſpongioſa, and are about the ſize of a tranſverſe ſection of a gooſe-quill, and acceſſible to the probe and perforator, when obſtructed; a circumſtance to which ſurgeons ſeem not to have paid ſufficient attention; for they have generally ordered the maxillary ſinus to be perforated from a ſocket of a tooth, or the external ſurface.

The Mouth.

The integuments are inflected over the lips, where they become very delicate, and, on account of numerous veſſels, acquire a florid colour.

Under this modification the integuments line the inſide of the cheeks, and reach the alveolary proceſſes of both jaws; at the anterior part of which, near the roots of the inciſor teeth, two duplicatures are formed, under the name of frænula labiorum; they then become thick and denſe, are called gums (gingivæ) and cover the proceſſes laſt-named, having perforations, except in infancy, equal to the number of the teeth, with which there is often a very cloſe adheſion.

From the alveolary proceſs of the under jaw the integuments are continued over the bottom of the mouth to the tongue, forming with the under part of it a duplicature, called frænum linguæ, which is ſometimes ſo narrow and extended forwards as to prevent ſucking. This requires inciſion.

The integuments cover the tongue entirely, exhibiting a longitudinal line on the middle of its upper ſurface that leads to a foramen cœcum or lacuna near its root.

The lingual nerves, particularly the ninth pair, peculiarly modified, are beſtowed on the integuments of the tongue, and become the organs of taſte; the prominent extremities of theſe nerves, called papillæ, can be eaſily diſtinguiſhed in many animals.

The tongue, almoſt entirely a muſcular organ, is capable of motion in every direction; and hence becomes immenſely important in maſtication, articulation, &c.

The integuments from the upper gum line the oſſeous palate, and are denſe and corrugated till they arrive at the ſoft and move-able palate, the velum pendulum palati, the under part of which they completely inveſt, joining behind with thoſe of the noſe, which cover its upper part.

The mouth may be conſidered to terminate in the contraction at the root of the tongue, mentioned in the Myology under the name of iſthmus faucicum.

In the triangular ſpaces in the ſides of the iſthmus faucicum, between the lateral arches, are lodged two flat glands of the compound and mucus kind, named tonſils (amygdalæ).

The ſurface of the tonſil turned to the iſthmus is cellular, and formed into lacunæ, in which the excreting ducts would ſeem to open; and the whole is covered by the integuments of the mouth, paſſing on to the fauces.

The tonſils are frequently the ſeat of inflammation (cynanche tonſillaris); of venereal ſecondary ulcer; and of ſchirrus, that requires exciſion.

The Fauces.

That cavity included between the iſthmus faucium and the oppoſite cervical vertebræ, is called fauces. It is bounded on the ſides by the carotid arteries and the adjacent parts, and above by the cuneiform proceſs of the occipital bone, and part of the body of the ſphenoidal one.

The fauces are lined, and chiefly formed by the integuments continued from the mouth and noſe, ſo as to reſemble, when diſengaged, a membranous bag with ſeven openings, viz. the poſterior nares, the Euſtachian tubes, the iſthmus faucium, pharynx, and glottis.

The faucial ſurface abounds with mucous glands or follicules, part of which can be ſeen from the mouth. They are frequently affected by venereal ulcer, which I have ſeen reach the adjacent vertebræ; and, in one inſtance, produce anchyloſis.

It will now be underſtood, that a probe or tube may be introduced by the noſtrils to the fauces, œſophagus, and ſtomach; as alſo by the mouth to theſe organs, and additionally to the trachea. Theſe facts demand every attention from the ingenious practitioner.

The Common Integuments.

The common integuments, coverings, or involucra of the various organs forming the animal ſyſtem, are membranous ſubſtances, and are,

1 Cellular ſubſtance,
2 True ſkin,
3 Reticular membrane.
4 Scarf-ſkin.

Cellular Subſtance.

The cellular or fatty ſubſtance or membrane (tela celluoſa, membrana adipoſa) is ſituated immediately within the true ſkin.

This ſubſtance is not a ſimple lamina; on the contrary, it is variouſly compounded, and in general formed into cells that contain for the moſt part an oil (adeps); hence the name.

The cellular membrane is variouſly abundant, and appears obviouſly under different modifications. The cells mutually communicate, and, with few exceptions, contain oil which they ſeem to prepare in conſequence of a glandular power; at leaſt no other organs capable to do this have been pointed out.

Proceſſes, as they may be called, from this membrane ſink between all the included parts, and even their fibres with little exception; ſo that it may not abſurdly be conſidered as a general cement or connecting medium.

The great comparative bulk and extent of this ſubſtance in health, may be conceived of from the ſhrinking that is produced in many diſeaſes; for the abundance of the oil gives corpulence, and the contrary, emaciation, and conſequently the facies Hippocratica.

Nature has wiſely prevented, by a diverſity in the ſtructure, the accumulation of oil in theſe parts where it would be inconvenient and hurtful; the eye-lids, genitals, &c.

It

This oil is alledged, with conſiderable probability, to be an internal ſtock of food or nutritious matter on which the abſorbents may ſeize in caſe of neceſſity; and hence the ſudden leanneſs when common food is denied.

The blood-veſſels are minutely ramified upon the cells of this ſubſtance; the arterial ones, no doubt, perform the ſecretion of the oil.

The cells are frequently the ſeat of diſeaſe:

1 Inflammation, which readily becomes ſuppurative, and more or leſs deſtroys its texture:

2 Dropſy (anaſarca) in which, when partial, the fluid tranſudes from one place to another, according to ſituation; it always poſſeſſes the loweſt:

3 Hæmatocele, ecchymoſis, thrombus, or tumour occaſioned by extravaſated blood:

4 Emphyſema, pneumatoſis, or ſwelling cauſed by extravaſated air, which ſometimes has become general.

The ſudden diſappearance of ſome of thoſe ſwellings, is a proof that many abſorbents originate from the cells.

The medullary membrane within the bones, ſeems to be very ſimilar to the adipoſe ſubſtance, and has been obſerved to ſuffer the like changes by diſeaſe.

True

True Skin.

The true-ſkin (cutis vera) ſituated immediately on the outſide of the cellular membrane, is the principal integument. It is a ſingle membrane of various denſity and modification; and, beſides the membranous ſibres, which are intricately interwoven, and ſeem to run in every direction, it conſiſts of

1 Blood-veſſels, exceedingly numerous, and variouſly diſperſed; ſome of the extreme arteries it would ſeem terminate on the ſurface by open mouths, ſo as to be called exhalants (vaſa exhalantia):

2 Lymphatic veſſels, of which a great number originate from the cutaneous ſurface, as appears by many facts----inoculation, mercurial inunction, &c.:

3 Nerves, which give acute ſenſibility, and in many places appear in the form of points or papillæ:

4 Glands, which are various in kind, and exceedingly numerous, as is ſhewn by their ſecretions. It is probable that the eruptive diſeaſes take their puſtular form from being principally ſeated in theſe.

The inward numerous and important proceſſes or inflections of this extenſive membrane have been occaſionally deſcribed.

Reticular Membrane.

This delicate ſubſtance (corpus reticulare Malpighi) is expanded along the external ſurface of the true ſkin; and is deſcribed as having meſhes that correſpond to the papillæ. It is the ſeat of the diſcriminating colour in the negroe.

It may be a peculiar modification of the cellular ſubſtance, forming the connection of the true and ſcarf ſkins, between which it is ſituated. In the eryſipelatous inflammation it becomes the ſeat of effuſion, which, when conſiderable, produces veſication or bliſter.

Scarf Skin.

The ſcarf-ſkin or cuticle (cuticula, epidermis) is the moſt ſuperficial integument. It is eaſily ſeparated from the reſt by epiſpaſtics, putrefaction, &c. and appears to be a ſingle lamina of various denſity, in which no fibres or veſſels can be traced. It has been ſuppoſed to be made up of minute ſcales.

The exhalant and abſorbent veſſels neceſſarily have orifices in the ſcarf-ſkin, through which the perſpiration and abſorbtion take place; theſe are commonly called pores of the ſkin, and are conſequently very numerous.

It is as devoid of nerves as of veſſels, and therefore has no ſenſibility; on the contrary it ſeems intended to obſcure the ſenſation of the true ſkin, which otherwiſe would be intolerable, and deſtructive of our commerce with ſurrounding bodies.

It ſeems highly probable that this almoſt unorganized covering is nothing elſe than the expanded extremities or orifices of the amazingly numerous veſſels, that begin from, or end on the ſurface.

The Hairs and Nails.

Hairs abound variouſly over the ſurface of the integuments, and ſeem to be intended for protection.

The nails are placed on the ends of the fingers and toes.

Theſe ſubſtances follow the fate of the ſcarf-ſkin, eſpecially when affected by putrefaction, and conſequently fall off with it; on this account ſome have ſuppoſed them to be produced by it. It ſeems, however, to be more conſentaneous to analogy to regard them as partaking conſiderably of a vegetable nature, and conſequently maintaining a connection with the integuments and body in general, like plants with the ſoil.

It may be a deduction from the foregoing remarks, that hair, nail, horn, hoof, beak, claw, feather, fin, ſcale, prickle, and whalebone, are ſpecies or varieties of one vegetoanimal plant; and their diverſity referable to general and ſpecific qualities.

The colour ſeems to depend on the kind and arrangement of the interſtitial matter, which is accordingly ſuſceptible of change more or leſs ſuddenly.

The integuments thus appear to be moſt excellently calculated to be the ſurface of our ſyſtem, by which the due intercourſe and connection with external bodies is formed.

It is evident that no ſubſtance can be ſaid to have entered the ſyſtem while it is ſimply in contact with or lies on the integuments; as is the caſe with the food in the ſtomach and inteſtine, air in the lungs, &c.

By any diſtending power acting ſlowly the integuments may be much ſtretched, as happens in pregnancy, dropſy, and ſubcutaneous tumour in general; and the veſſels acquire a proportioned ſize. They gradually recover their proper dimenſions when the diſtending cauſe is removed, provided they have not become highly morbid. This circumſtance ſhould prevent the ſurgeon from cutting off any part of them unneceſſarily in his various operations; on the contrary they ought to be carefully and proportionally preſerved in the amputations; becauſe a ſpeedy cicatrization entirely depends on them. In a proper attention to this circumſtance conſiſts a chief modern improvement in ſurgery.

ADENOLOGY.

IT has been premiſed that Adenology treats of the glandular ſyſtem, which conſiſts at leaſt of

1 Simple 2 Compound 3 Conglobate	glands.

A ſimple gland or follicle (glandula ſimplex) is formed by an artery, peculiarly modified to convey the blood and make a ſecretion, and a vein to reconvey the blood, after the ſecretion has taken place, to the common maſs; and an excreting duct or cavity, to carry off or contain the ſecreted matter.

Theſe glands are for the moſt part ſmall.

A compound gland (glandula compoſita vel conglomerata) conſiſts of many ſimple glandules, that receive their blood from the ſame ſource, and have a common excreting duct or ducts, conſtituted by a ſmall one ſent out from each glandule.

Many of theſe glands are of great ſize; as the liver and pancreas.

A conglobate gland (glandula conglobata) is pervaded by one or more lymphatic veſſel; and does not ſeem to perform any ſecretion, at leaſt no excreting veſſels have been pointed out as iſſuing from it, unleſs the lymphatics be regarded as ſuch.

The number of conglobate glands is exceeding great, and their ſize is various.

The glands have been called according to the matters (which are conſiderably numerous) they prepare; ſalivary, biliary, &c.

The ſimple glands are copiouſly diſperſed over the integuments, as has been mentioned, and are chiefly of the ſebaceous and mucous kinds; and named, from ſituation, lingual, labial, &c.

Diſeaſe ſoon interrupts the functions of theſe glands; therefore the ſagacious phyſician pays due attention to the ſtate of the ſkin, tongue, &c.

The large compound glands are placed wherever a great ſecretion is wanted: thus the lachrymal glands are devoted to the eyes; the parotid, maxillary, and ſub-lingual ones to the mouth; and the liver and pancreas to the inteſtine.

The thyroid gland is a bilobular maſs; the body or middle is ſituated on the inferior part of the larynx, while the lobes, one on each ſide, ſtretch down on the ſides of the trachea, ſometimes nearly to the ſternum: excreting ducts have not been diſcovered. It receives its blood from the ſuperior and inferior thyroid arteries, mentioned in the Angiology.

The middle part of this gland is generally wounded in the operation called bronchotomy, and a briſk hæmorrhage enſues, which, if circumſtances permit, ought to be reſtrained before the trachea be opened, for the moſt obvious reaſon.

The mammæ, or breaſts, more or leſs pyramidal and prominent from the fore part of the cheſt, are collections of milk-glands.

The numerous glands are connected by veſſels and cellular ſubſtance.

The cellular ſubſtance forms a kind of inveſtment or cyſt about them, looſely attached to the contiguous muſcle, ſo as to permit a degree of gliding. It adheres more cloſely to the integuments, particularly the areola or diſk, about the nipple (papilla).

The nipple is a bundle of the trunks of the excreting ducts of the milk-glands; it contains about twenty, and carries in its top the like number of correſponding orifices. The cellular matter binding them together is peculiarly elaſtic, and, by corrugating them, performs in ſome degree the function of a valve, preventing ſomewhat the eſcape of the milk.

The diſk abounds obviouſly with ſebaceous glands for protection.

The milk glands begin to be evolved about the thirteenth and fourteenth years, in this climate, and give proportional ſize to the breaſts.

The mammary and epigaſtric arteries furniſh blood to the glands.

Their abſorbent veſſels run through numerous conglobate glands to the axillary ones.

Theſe organs are by function intereſted in parturition and its conſequences.

On account of the ſmallneſs and intricacy of the glandular veſſels, obſtruction and diſeaſe frequently exiſt in them; therefore the practitioner ought to be well acquainted with their ſtructure and ſituation.

The mammary glands frequently become ſchirrous, eſpecially in the female, in the decline of life. It is not eaſy to determine whether the milk or lymphatic glands are primarily affected; but in the advanced ſchirrous ſtate both certainly become morbid; and when effuſion happens, the acrid matter is readily conveyed by the numerous abſorbents to the axillary glands, which in conſequence become enlarged, and equally diſeaſed; and from theſe it is extended to others, and to the ſyſtem at large.

The true and ſafe plan of treatment of ſuch diſeaſe is to remove it completely by amputation: this, experience has fully ſhewn. Obviouſly, therefore, the ſooner the better; for after the axillary glands are affected the event becomes exceedingly doubtful, and, indeed, the execution of the plan often impracticable.

THE

The Blood.

IT was obſerved in the introduction, that the blood is that fluid which naturally fills and is circulated in the arteries and veins.

Senſible Qualities.

1 Colour: this is generally red.
2 Taſte: this is bland.
3 Temperature: this is about ninety-ſix degrees of FARENHEIT'S thermometer.
4 Quantity: this is various; in an adult it has been ſuppoſed to be about fifty pounds.

Compoſition.

The blood is a heterogenous maſs, as appears by its decompoſition, which is

1 Spontaneous,
2 Chemical.

By ſpontaneous decompoſition are obtained,

1 Halitus,
2 Craſſamentum,
3 Serum.

Halitus.

The halitus is the ſteam or vapour that is exhaled from newly extravaſated blood. It is comparatively in ſmall quantity; its ſmell is betwixt that of urine and ſweat.

Craſſamentum.

The craſſamentum is the cake, grume, or coagulated part that is loweſt in a quantity of cold blood, which therefore appears to be heavieſt.

This ſubſtance conſiſts of

1 Globules,
2 Coagulable lymph.

Globules.

The globules are generally red, and notwithſtanding the name are not ſpherical, but rather ſpherules very much compreſſed. It ſeems probable that they are conſiderably organized, for in each a ſmall particle is viſible, which has been ſuppoſed to be contained in a veſicle.

The diameter of a globule has been computed to be the 3240 part of an inch, and is, notwithſtanding, ſpecifically heavier than water or ſerum.

The proportion of the red particles to the other parts of the blood is various, and may be conſidered to be greateſt in the florid and ſanguine ſubject.

The Coagulable Lymph.

The coagulable lymph is a whitiſh and glutinous matter that has a ſtrong tendency to become ſolid, or coagulate, eſpecially when extravaſated; and thus is eaſily obtained by itſelf.

It is this remarkable tendency to become ſolid that gives the following phænomena:

1 The general and ſeemingly uniform but temporary coagulation of newly effuſed blood:

2 The formation of the craſſamentum; which probably happens in conſequence of the ſerum being ſqueezed out by the adunation of this matter while it entangles the red part:

3 The whitiſh cruſt or buff that often covers the upper part of the craſſamentum, and is frequently of great thickneſs and ſolidity:

4 The concretions (polypi) often diſcovered in the great veſſels after death, of which they have been ſuppoſed to be the cauſe:

5 The laminated condition of the contents of aneuryſm often met with:

6 The appearance of thread-like or worm-like ſubſtances, when flowing blood is mixed with heated water:

7 The ſpontaneous ſtopping of hæmorrhage from the ſmaller veſſels:

8 The formation of the mole or falſe conception (mola).

The Serum.

The ſerum is the greeniſh, bluiſh, or water-like fluid that floats above and about the craſſamentum in extravaſated blood properly circumſtanced.

This fluid, often called ſeroſity, contains,

1 Gluten, coagulable by heat, in great proportion:

2 Salt, chiefly of the neutral and muriatic kind, in ſmall quantity:

3 Water, various as to proportion.

In ſome inſtances it has been obſerved to be white.

By chemical decompoſition or analyſis, blood is reduced into

1 Volatile alkali;

2 Water;

3 Empyreumatic oil;

4 Coal (caput mortuum); which contains neutral ſalt, earth, and ſome particles affected by the magnet.

The ſpontaneous decompoſition of the blood is the moſt ſatisfactory; becauſe, by reuniting the halitus, &c. we in ſome meaſure reproduce blood, which in no degree happens by mixing the products of the chemical one. Indeed theſe are the ſame, only varied in proportion, whether a whole animal or any of its parts be ſubjected to this analyſis.

A general concluſion is, that the blood is a peculiar fluid not to be produced by art, nor indeed by nature, as far as appears, except by what may be called the animal proceſs, to be afterwards conſidered.

There ſeems to be no reaſon to conclude, ſince the blood is a compound and ſeemingly organized fluid, that it may not occaſionally be the ſeat of diſeaſe in the firſt inſtance.

Every one knows that great hæmorrhage is followed inſtantly by weakneſs or death.

PRINCIPLES

OF

PHYSIOLOGY.

Life.

PHYSIOLOGY conſiders the body as animated or living, and endeavours to explain the actions or functions of the various organs, deſcribed by anatomy, that conſtitute the phænomena or ſymptoms of life.

As the functions in every inſtance depend on the mechaniſm or ſtructure of the organs (for they are invariably affected by every cauſe that affects this); it is a neceſſary conſequence that life is not a principle ſuperadded to organization, but the effect of it; therefore we may ſafely regard the terms, life, vitality, vital principle, living principle, excitability, &c. as ſynonymous, and expreſſing a condition of the organs only.

It farther follows, that as perfect organization is the immediate ſource or proximate cauſe of life muſt alſo be that of health; therefore an alteration, derangement, and extinction of it muſt be that of diſeaſe and death.

It is not the province of the phyſiologiſt to comment on the immortal and immaterial part of man, commonly called the ſoul. Matter is his object: all beyond it is fitly left to the metaphyſician.

All the functions either immediately ſpring from or much depend on the nervous ſyſtem; which every circumſtance ſhews to be the principal organ, to which all the others are ſubſervient, like ſo many tools or inſtruments.

The brain is the chief part of the nervous ſyſtem; but the human brain is larger than any other; and, therefore, if it be admiſſible to conſider the brain as the animal, man is the largeſt animal in the creation: for the ſuperior bulk of the whale, elephant, &c. ariſes from the inſtrumentary parts of their bodies.

Man derives his ſuperiority among animals, not from the quantity only, but alſo from the quality of the brain; for the ſimilarity of its ſubſtance in all animals, as far as inſpection goes, and the diverſity of its powers ſhew a generic and ſpecific diſtinction; that is to ſay, there is an arrangement common to brain in general, and modifications of this, correſponding to kinds, ſpecies, and individuals.

The Author of Nature has in the moſt wonderful manner adapted the inſtrumentary parts of every animal to the ſpecific qualities of the brain: thus the hands of a man could be of little or no uſe to the horſe; becauſe the equine ſtructure of the brain diſqualifies him from duly employing them; and ſo of any other animal.

Senſation.

Experience ſhews that ſenſation or feeling is ſolely a function of the nervous ſyſtem, and principally reſident in the extremities of the nerves, which are therefore called ſentient; for if the nerves of any part be deſtroyed, ſenſation is likewiſe deſtroyed.

It is in general neceſſary that the ſubſtance to be felt ſhould be applied more or leſs cloſely to the ſentient extremities of the nerves.

Impreſſions thus received are communicated to the ſenſorium commune, through which alone, it ſeems probable, what is called the ſympathy of the nerves takes place.

Thus it ſeems the nerves are ſo many productions from the ſenſorium commune, intended to act as feelers to receive and convey notices, that it (the animal) may act accordingly.

The mode in which impreſſions are thus communicated from the extremity of a nerve to the brain, and in which the nerve itſelf is connected with the brain, is not aſcertained; we muſt remain contented with the knowledge of the fact till we become better acquainted with the mechaniſm.

It is proper to mention that the cortical part of the brain has been very generally regarded as glandular, and capable to ſecrete a ſubtile matter called nervous fluid and animal ſpirits, ſuppoſed to be the medium of the intercourſe in queſtion.

All nerves are not fitted to receive every occurring impreſſion properly, and therefore we obſerve that certain ones are devoted to certain impreſſions, called organs of the ſenſes; five may be ſpecified.

1 *Smelling.*

The firſt pair of nerves are the organ of ſmelling (odoratus) and on this account called olfactory. They are fitted by their organization to be impreſſed by the volatile matter that continually iſſues from odoriferous bodies, and occaſionally diffuſed in air that is inhaled in reſpiration *; with much propriety therefore ſituated in the naſal cavity, where they are at once duly expoſed to the impregnated air, and protected from rude and deſtructive ſubſtances.

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* Natural philoſophy informs us, that all animal and vegetable bodies, and probably all or moſt other bodies, while expoſed to the air, are continually ſending forth effluvia of vaſt ſubtilty, not only in their ſtate of life and growth, but in their ſtates of fermentation and putrefaction These volatile particles do probably repel each other, and ſo ſcatter themſelves in the air, until they meet with other bodies to which they have ſome chemical affinity,

Animals, whoſe ſubſiſtence and ſafety depend on acuteneſs of this ſenſe, have the nerves large and the oſſa ſpongioſa much convoluted, to give them ſufficient extenſion.

2 *Seeing.*

The ſecond pair of nerves are the organ of ſeeing (viſus) and therefore named optic, and are ſo delicately conſtructed as to be impreſſed by light, one of the moſt ſubtile matters known *.

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nity, and with which they unite, and form new concretes. All the ſmell of plants, and of other bodies, is cauſed by theſe volatile parts, and is ſmelled wherever they are ſcattered in the air: and the acuteneſs of ſmell in ſome animals, ſhews us, that theſe effluvia ſpread far, and muſt be inconceivably ſubtile.----REID's Inquiry into the Human mind.

* The rays of light which miniſter to this ſenſe, and of which, without it, we could never have had the leaſt conception, are the moſt wonderful and aſtoniſhing part of the inanimate creation We muſt be ſatisfied of this, if we conſider their extreme minuteneſs, their inconceivable velocity, the regular variety of colours they exhibit, the invariable laws according to which they are acted upon by other bodies, in their reflections, inflections, and refractions, without the leaſt change of their original properties, and the facility with which they pervade bodies of great denſity, and of the cloſeſt texture, without reſiſtance, without crowding and diſturbing one another, without giving the leaſt ſenſible impulſe to the lighteſt bodies.----REID's Inquiry into the Human Mind.

It is unneceſſary to ſay, that the body ſeen does not touch the optic nerves or retinæ; the various rays reflected from its ſurface, tranſmitted and refracted by the coats and humours, impreſs the retina, and excite viſion.

Diſtinct viſion reſults from the mechaniſm of the eye-balls being perfect; for if the retinæ be not duly ſenſible the pictures will not be perceived; and if the cryſtalline humour be too ſpherical, or the contrary, the images will fall before or behind the retinæ, and conſequently not make the requiſite impreſſion.

Phyſiologiſts have diſputed much about the cauſe, why an object ſeen with both eyes ſhould appear ſingle? This perhaps happens becauſe with reſpect to the ſenſorium the two optic nerves being of the ſame modification, and ſimilarly impreſſed by pictures of one object falling on correſponding parts, act as one *. It ſeems to be eaſier to conceive this to be the caſe, than that one object ſeen in ſuch circumſtances ſhould appear double.

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* From theſe phænomena, and from all the trials I have been able to make, it appears evidently, that in perfect human eyes, the centres of the two retinæ correſpond and harmonize with one another; and that every other point in one retina, doth correſpond and harmonize with the point which is ſimilarly ſituate in the other; in ſuch manner, that pictures falling on the correſponding points of the two retinæ, ſhew only one object, even when there are really two: and pictures falling upon points of the retinæ which do not correſpond, ſhew us two viſible appearances, although there be but one object.---REID's Inquiry into the Human Mind.

It is no eaſy taſk to explain why objects appear not inverted, becauſe their pictures are always inverted at the retinæ. Are we to refer this to habit, or to a law of nature? At any rate it ſeems to be certain, that our preceptions by the eye are much aſſiſted by the other ſenſes, and by experience *.

3 *Hearing*.

The ſeventh pair of nerves, expanded in the tympana and cavities of the oſſa temporum, are the organs of hearing, therefore called auditory.

Hearing reſults from the impreſſion of the undulations of the air, or ſound on the auditory nerves; to collect and direct which, the cartilaginous parts are excellently calculated;

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* It will, without doubt, be allowed, that I ſee the whole object in the ſame manner and by the ſame law by which I ſee any one point of it. Now, I know it to be a fact, that, in direct viſion, I ſee every point of the object in the right line that paſſeth from the centre of the eye to that point of the object: and I know likewiſe, from optics, that the rays of light that comes to the centre of my eye, paſſes on to the retina in the ſame direction. Hence it appears to be a fact, that every point of the object is ſeen in the direction of a right line paſſing from the picture of that point on the retina through the centre of the eye. As this is a fact that holds univerſally and invariably, it muſt either be a law of nature, or the neceſſary conſequence of ſome more general law of nature. And, according to the juſt rules of philoſophiſing, we may hold it for a law of nature, until ſome more general law be diſcovered, whereof it is a neceſſary conſequence, which I ſuſpect can never be done.---REID's Inquiry.

in many animals they poſſeſs exquiſite motion, ſo as to be inſtantly turned in any direction *.

The membranes of the drums are obviouſly intended to moderate the waves of ſound, that they may not act too rudely and deſtroy the delicate nervous matter.

Water is a medium of ſound, as appears from various experiments, and the ears of fiſhes.

4 *Taſting.*

The ninth or lingual pair of nerves, expanded on the tongue, conſtitute the organ of taſting.

This organ is impreſſed by the ſapor of bodies,

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* Sounds have probably no leſs variety of modifications, than either taſtes or odours. For, firſt, ſounds differ in tone. The ear is capable of perceiving four or five hundred variations of tone in ſound, and probably as many different degrees of ſtrength; by combining theſe we have above twenty thouſand ſimple ſounds that differ either in tone or ſtrength, ſuppoſing every tone to be perfect. But it is to be obſerved, that to make a perfect tone, a great many undulations of elaſtic air are required, which muſt all be of equal duration and extent, and follow one another with perfect regularity; and each undulation muſt be made up of the advance and recoil of innumerable particles of elaſtic air, whoſe motions are all uniform in direction, force, and time. Hence we may eaſily conceive a prodigious variety in the ſame tone, ariſing from irregularities of it, occaſioned by the conſtitution, figure, ſituation, or manner of ſtriking the ſonorous body: from the conſtitution of the elaſtic medium, or its being diſturbed by other motions; and from the conſtitution of the ear itſelf, upon which the impreſſion is made.---Reid's Inquiry.

bodies: an active matter more or leſs ſoluble in the ſaliva *.

Taſting, like the other ſenſes, is variouſly acute in different animals, and in all is obviouſly intended to guard the entrance of the alimentary canal, and in general it may be truſted.

5 *Touching*.

The cutaneous nerves, formed into papillæ, are the organ of touch, which is very generally diffuſed over the ſurface of the whole body; but is moſt acute and diſtinct in the extremities of the fingers and toes, eſpecially the former.

Solid bodies, which make comparatively a rude impreſſion, and might therefore deſtroy the more delicate organs, are the object of this ſenſe.

The acuteneſs of touch greatly depends on the ſtate of the ſcarf-ſkin, which is ſtretched like a vail over the nervous papillæ; therefore wherever this is extremely delicate, ſenſibility is greateſt, and vice verſa.

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* It is probable that every thing that affects the taſte, is in ſome degree ſoluble in the ſaliva. It is not conceivable how any thing ſhould enter readily, and of its own accord, as it were, into the pores of the tongue, palate, and fauces, unleſs it had ſome chemical affinity to that liquor with which theſe pores are always replete. It is therefore an admirable contrivance of nature, that the organs of taſte ſhould always be moiſt with a liquor which is ſo univerſal a menſtruum, and which deſerves to be examined more than it hath been hitherto, both in that capacity, and as a medical unguent. Nature teaches dogs, and ather animals, to uſe it in this laſt way; and its ſubſerviency both to taſte and digeſtion, ſhews its efficacy in the former.---REID's Inquiry.

Conſciouſneſs.

The brain in general, but more eſpecially the medullary part of it, appears from every fact and experiment to be the organ of the internal ſenſes (ſenſus interni) conſciouſneſs, &c.

The intercourſe between this ſupreme organ and external objects, is entirely dependent on the ſentient nerves; that is to ſay, all impreſſions made on the latter excite correſponding ſenſations in the former.

The following opinions on this ſubject are not eaſily underſtood:

"As the nervous ſyſtem is the medium interpoſed between the living principle and the ſeveral organs which compoſe the bodies of animals, an exact knowledge of its ſtructure and functions muſt appear to the philoſopher, as well as to the phyſician, of high importance in the ſtudy of nature *."

"But although, beyond the place at which a nerve is cut, or in a member amputated, a wound does not excite pain; yet, in conſequence of that wound, effects follow which we cannot account for on mechanical principles.

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* Dr. MONRO's Nervous Syſtem, p. 1.

" Thus, a ſlight puncture of the heart of a frog, ſeparated from its body, throws all its fibres into violent motion. Such a cauſe appears ſo diſproportionate to its effects, that we cannot help conceiving that ſome living principle has been influenced: or that there are two kinds of feeling, one with, and another without conſciouſneſs: the latter, perhaps, reſembling that kind of feeling which we muſt ſuppoſe inherent in vegetables, and in conſequence of which their veſſels are ſo actuated as to produce ſtill more numerous and wonderful changes on the fluids they convey and ſecrete, than are to be obſerved in the animal kingdom *."

" When we throw into the ſcale the various effects of what has been commonly called the inſtinct of animals, does it not appear, that the moſt juſt, as well as moſt becoming concluſion we can draw, is, that the Power which created all things, which gave life to animals, and motion to the heavenly bodies, continues to act upon, and to maintain all, by the unceaſing influence of a living principle pervading the univerſe, the nature of which our faculties are incapable of duly comprehending § ?"

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* Dr. MONRO's Nervous Syſtem, p. 88.

§ --- ------------------------------ p. 104.

Muſcular Action.

The muſcles may be conſidered as a collection of ſprings to move the other organs of the body relatively or abſolutely ; a function called muſcular action, motion, or contraction.

This moving power is peculiar to muſcle ; ſo that wherever it is diſcovered the preſence of muſcle may be inferred, and *vice verſa.*

When a muſcle is in action it becomes ſhorter and harder than when inactive : action is excited by irritation or ſtimulus.

Thoſe muſcles that act in conſequence of volition are called voluntary muſcles ; and thoſe which cannot be controlled by it are named involuntary muſcles, or muſcles of involuntary motion, *viz.* the vaſcular, the inteſtinal, and reſpiratory muſcles.

Volition gives the neceſſary ſtimulus to the voluntary muſcles ; and the regular application of other ſtimuli accounts for the action of the involuntary ones.

It is impoſſible to doubt that a peculiar mechaniſm or ſtructure gives the capability of contraction to the muſcles ; which ſeems to be what is by ſome called vis inſita ; but that irritability may really happens a connection with the brain by nerves is in general eſſential, or a vis nervea muſt be preſent.

The nature of the vis nervea, or that influence communicated by the nerves to muſcles, is not underſtood: it is contended that it in ſome meaſure may be derived from the ganglia.

Muſcles on oppoſite ſides of any organ or member that counteract one another, called antagoniſt muſcles, are neceſſary to an equilibrium of motion.

Muſcular motion in the blood veſſels is called pulſation, and in the inteſtine periſtaltic motion, from circumſtances.

Aſſimilation.

Aſſimilation, or the animal proceſs, denotes the change the food (ingeſta) undergoes till it be fit to become a conſtituent part of the body, and therefore comprehends

1 Maſtication,
2 Deglutition,
3 Digeſtion,
4 Sanguification.

Maſtication.

Food chiefly conſiſts of animal and vegetable matters, which it is for the moſt part neceſſary to chew or maſticate.

The teeth are the principal inſtruments of maſtication; a taſk for which they are admirably fitted. The cheeks and lips on the one ſide, and the tongue on the other, co operate with the teeth by keeping the morſel within their action, which conſequently, by an admixture of the ſaliva, is reduced to a pulp.

Deglutition.

Maſtication, when neceſſary, being accompliſhed, the morſel, by means of the tongue chiefly, is puſhed into the fauces and pharynx, ſhutting the glottis as it paſſes, and then into the œſophagus and ſtomach by the conſtrictor muſcles and periſtaltic contraction of the œſophagus itſelf principally; a proceſs named deglutition.

Digeſtion.

The ingeſta, in a great meaſure unchanged, fall into the ſtomach, which may be conſidered as a receptacle for ſuch a quantity as ought to be taken at once.

Hunger, the ſenſation of want or emptineſs, which we feel about the ſtomach when food is neceſſary, is probably cauſed by its being flaccid.

During maſtication the food is blended with a conſiderable quantity of ſaliva; and in the ſtomach it meets with a ſecretion, not very copious; this joined with the drink makes the whole a ſemifluid; which expoſed to heat and agitation in a conſiderable degree is gradually propelled through the pylorus into the inteſtine, where it is intermixed with the bile and pancreatic liquor.

Thus it ſeems evident, that this proceſs, commonly named digeſtion, is analagous to what is called mechanical ſolution. If, however, it be unduly performed, a degree of the acetous fermentation ſoon ariſes (hence flatus and acidity); to check this, and at ſame time to promote the animalization, is a chief uſe of the bile, which is therefore by no means an excrementitious fluid.

The fine and fluid part of the digeſted maſs, commonly called chyle, is very rapidly abſorbed by the numerous lacteal veſſels (ſo named on account of the milky appearance of the chyle) and conveyed by the thoracic duct to the left ſubclavian vein, where it is blended with the common maſs of blood.

The coarſe and inſoluble part of the ingeſta is propelled along the alimentary canal by the periſtaltic motion, and, under the name of fæces, is accumulated in the rectum, which ſerves as a cloaca, and occaſionally, by its irritation, is ejected by the anus.

Sanguification.

The chyle, mixed and circulated with the blood, is gradually and completely aſſimilated and animalized or converted into blood; a change called ſanguification (hæmatopoeſis) which is chiefly to be aſcribed to vaſcular action in general, and not to that of any particular part, ſuch as the lungs and ſpleen.

Circulation of the Blood.

That the blood is moved or circulated in its veſſels, is manifeſted by

1 Hæmorrhage;
2 Compreſſion by ligature;
3 The microſcope;
4 Anatomical injections.

The heart is the centre of this motion; for the blood is conveyed from it in the arteries, and returned in the veins.

The veins open into or rather form the auricles; conſequently the venæ cavæ pour their blood into the right one, and the pulmonary veins into the left one; ſo both are diſtended at the ſame time.

The blood is urged through the auricular orifices by the contractions of the auricles; becauſe it is prevented from a retrogade courſe by the vis a tergo, and the tricuſpid and mitral valves readily yield, and of conſequence both ventricles are diſtended.

The ventricles thrown into contraction, force their contents, the right one into the pulmonary artery, and the left one into the aorta; becauſe the tricuſpid and mitral valves reſiſt any tendency towards the auricles, while the ſigmoid valves open towards the arteries; therefore as much blood in a given time is tranſmitted through the lungs as through all the body beſides.

The diſtended ſtate of the auricles, ventricles, and arteries is termed diaſtole; and their contracted condition, ſyſtole.

From what is premiſed it is plain, that the diaſtoles of the auricles and arteries coincide in point of time: that of the latter is termed pulſation and pulſe, as before-mentioned.

The pulſe is more frequent and rapid in the young than in the old ſubject: its medium number in the healthful adult, in one minute, is ſeventy-two, which amounts to 4320 in the hour, and 103,680 in the day.

It was already mentioned that the vaſcular muſcle, or muſcular coat of the arteries, is involuntary. The reaſon of this, and of its conſtant action, is the regular application of the ſtimulus of the blood, which probably is both mechanical and chemical; becauſe, when the blood by any cauſe is impelled with undue force towards the heart, the number and force of the pulſe is increaſed.

It is a clear deduction, that if the ſtimulant power of the blood, or ſenſibility of the veſſels, or both, be increaſed, that the circulation will be accelerated; as happens more or leſs in fever, &c. and *vice verſa;* and that there ſubſiſts a neceſſary relation between the ſtate of the blood and veſſels, which will ever render the transfuſion of the blood of one animal into the veſſels of another deſtructive or fatal.

The heart is the chief but not ſole mover of the blood; for the vaſcular muſcle co-operates, and is principally efficient in propelling it in the ſmall veſſels, where its action is called oſcillatory motion, and oſcillations.

It would ſeem that the blood's motion is moſt rapid in the greateſt veſſels, and neareſt the heart, and *vice verſa*, on account of the capacity of the ramifications being greater than that of the trunks *; a circumſtance highly favourable to nutrition and ſecretion.

Nature ſeems to have anxiouſly provided for a languid circulation in the brain, by the inflected courſe and mode of ramification of its arteries; a circumſtance eſſential to its function.

Nutrition.

The augmentation or growth, and the repair of the continual waſte of the body, in conſequence of its inceſſant motion, and the action of ſurrounding matter, are proofs that it is conſtantly nouriſhed.

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* Dr. GOODWIN, my ingenious friend, aſſures me that he has made experiments that render this common opinion doubtful.

The blood may be conſidered as the ſoil from which all the parts draw their nouriſhment; and accordingly it is diffuſed in the moſt perfect manner for this purpoſe.

It is little to be doubted, that every organ has a peculiar faculty of attracting from the blood that is ſent to it thoſe parts that are the moſt congenial and proper for its growth and repair, and perhaps of inducing in them a partial aſſimilation.

It is not determined by experiment which of the conſtituent parts of the blood is moſt efficient in nutrition; the coagulable lymph ſeems to be well calculated to adhere to the ſolids.

The immediate appoſition of the nutritious matter in all probability depends on a peculiar attraction, or a plaſtic condition, the effect of organization; and therefore it may be called the plaſtic proceſs, and is common to animals and vegetables.

It is obvious that the conſtancy of this proceſs is eſſential to life, and its perfection, to health; and that its diminution is diſeaſe, and its interruption, for any conſiderable time, death; hence we diſcover the true object and limit of the healing art.

Notwithſtanding the diſputes of phyſiologiſts there is little reaſon to doubt that the extreme veſſels, and not the nerves, are the channels that tranſmit the nouriſhment to every part of the ſyſtem; the nerves indeed are indiſpenſable in ſo far as they give ſenſation and motion.

Thus we perceive the gradual manner in which aſſimilation proceeds; and that its great object is nutrition; and that it is entirely the operation of the ſolids; and that there is a congeniality between the fluids and and ſolids eſſential to life and health; or, in other words, the blood that nouriſhes an animal muſt be the produce of its own veſſels; and finally, the cauſe of the fatal effect of transfuſing it from one to another.

As diet furniſhes the materials for the plaſtic proceſs, how manifeſt is it that the moſt important changes may be induced by dietetics, as to the cauſe and cure of diſeaſe! A fact of the laſt importance in medicine.

Secretion.

The glands, however different in form, prepare matters more or leſs fluid from the blood; a function indiſpenſably neceſſary to that of the other organs, and to life itſelf.

The matters ſecreted are

1 Uſeful,
2 Excrementitious.

The firſt ſerve ſome valuable purpoſe in the body; the latter, conſiſting of parts no longer uſeful, are ejected.

The principal ſecretions are,

1 Lymph,
2 Sebaceum,
3 Mucus,
4 Synovia,
5 Tears,
6 Saliva,
7 Cerumen,
8 Bile,
9 Pancreatic fluid,
10 Semen,
11 Milk,
12 Perſpirable matter,
13 Mephitic matter,
14 Urine.

The modifications of the glandular ſtructure, which produces ſuch variety of effect, cannot be pointed out by anatomy.

Phyſiologiſts diſpute much about the mode of ſecretion. While one contends that it is effected by the glands as ſtrainers, another aſſerts that it depends on a changing power poſſeſſed by them: and indeed, as a general aſſimilation of the ingeſta is performed by the vaſcular ſyſtem at large, it does not ſeem to be abſurd to conclude that a particular one ſhould take place in particular glands, and give all the variety ſpecified; on the contrary it is rather a beautiful idea, and much favoured by analogy: for inſtance, it muſt be a power of this ſort that is the ſource of that endleſs and extremely delightful variegation obſervable in many animal and vegetable ſubſtances, viz. feathers, flowers, &c.

Excretion.

Excretion is that act of the excretories whereby the ſecreted matters are conveyed to their proper ſituations.

It will appear to be neceſſary that a balance ſhould be maintained between the ſecreting and excreting organs, otherwiſe diſeaſe will enſue.

The motion of the fluids in the excreting ducts ſeems to ariſe from their contractility and from the vis aetrgo.

Abſorption.

The lymphatic and lacteal veſſels perform abſorption; hence they are commonly named abſorbents.

Theſe veſſels, which are exceedingly numerous, originate from the cells, cavities, and ſurface of the ſyſtem.

The lymphatics that begin from the ſurface are the only proper inlets to the ſyſtem; hence food, &c. are tranſmitted through them, as appears by numberleſs facts.

The exhalant veſſels, which ſeem to be arterial, are conſtantly diſcharging a lymph or halitus. From thoſe thoſe that end in the ſurface the diſcharge is called inſenſible perſpiration, and perſpirable matter, and entirely eſcapes; while that emitted by thoſe that open into cells and cavities is neceſſarily detained for various purpſes, and would ſoon be accumulated to a hurtful degree, if not proportionally removed by the correſponding abſorbents.

Thus it appears that there muſt conſtantly exiſt an equilibrium of action between the exhalants and abſorbents, otherwiſe diſeaſe, particularly dropſy, general or local, enſues.

It is not eaſy to point out the ſtructure of the abſorbents, at the orifices, that enables them immeiately to take in their fluids, nor the functions of the conglobate glands through which they paſs. Their numerous valves are obviouſly calculated to prevent retrogreſſion, which they do effectually. Therefore it is vain to attempt an explanation of morbid phænomena, from a ſuppoſition of a retrograde motion being poſſible, or rather taking place.

It is highly conſequential in medicine to be well acquainted with the courſe of the abſorbents

Menſtruation.

Menſtruation.

Menſtruation is a periodical diſcharge of blood from the uterus.

This remarkable function of the female œconomy is entitled to ſpecial attention.

The interval between two conſecutive menſtruations is about twenty-ſeven or twenty-eight days; ſo that it occurs about thirteen times during the year.

The effuſed fluid is called catamenia, menſes, menſtrual diſcharge, becauſe it is monthly; and, on account of its regularity and connection with health, it is very commonly named courſes and flowers.

A ſmall fluctuation as to the term is conſiſtent with health.

The quantity, according to habit and other circumſtances, is various; in general it amounts to ſix, eight, or ten ounces, and often much more.

The quality is healthful, and by no means vitiated.

Each menſtruation endures from three to eight or ten days; ſo that it proceeds leiſurely, like an oozing or exſudation.

The time of life at which it firſt occurs, is much varied by climate and other cauſes.

In the ſouthern latitudes it happens as early as the eleventh year, In this and other northern countries it takes place about the fourteenth, and even eighteenth and twentieth year.

It is a mark of maturity.

The time of diſappearance is as various as that of commencement: indeed both depend on the ſame primary cauſes; an early commencement and diſappearance are connected.

It ceaſes in theſe climates about the forty-fifth or fiftieth year, with few exceptions.

It is ſuſpended during pregnancy and ſuckling; if it occurs in the former, it may be regarded as diſeaſe (menorrhagia catamenialis *).

The ſource is unqueſtionably the arteries which open on the ſurface of the lining membrane of the uterus.

Theſe appear to be the ſame with or very analogous to the exhalant ones, ſo abundant on all other portions of the ſurface.

Some authors have ſuppoſed the menſtruating veſſels to be peculiar in their ſtructure.

It is often preceded by

1 Laſſitude,
2 Headach,
3 Pain,
4 Quick pulſe §.

It is difficult to point out that ſtate of the veſſels of the uterus which is its proximate cauſe.

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* Plenck's Elem Art. Obſt.

§ Foster's Midwifery.

Plethora or fulneſs, is perhaps always much concerned.

To decide whether this be general or local, does not ſeem to be a point of much moment; for the difference is only that of a whole and a part.

It is exceedingly difficult to aſſign the occaſional cauſes of the return, at intervals ſo ſurpriſingly equal.

A reference to the change of the moon is not a proper ſolution of this queſtion.

May they not be the ſame that give, in due ſeaſon, the vegetation, flowering, &c. of plants?

The final cauſe ſeems to be, to preſerve a condition of the uterus favourable to pregnancy; becauſe, before its commencement, and after its diſappearance, and even during any remarkable irregularity, pregnancy does not happen.

Generation,

The generation of the fœtus, is the moſt aſtoniſhing fact in natural hiſtory; accordingly, in every age, it has been a darling ſubject of philoſophical reſearch.

It is much to be regretted, that a juſt explication of an event ſo intereſting has not been obtained.

Generation comprehends

1 Conception,
2 Pregnancy.

Conception, or impregnation, is the immediate formation or vivification of the fœtus.

The principal conditions are,

1 Maturity,
2 Health,
3 Sexual commerce.

It ſeems to be certain, that conception is immediately tranſacted in the ovaria; theſe being the only ſeminal or proper genital organs on the part of the female.

The proofs are,

1 Turgeſcence of one or more veſicles,
2 Corpora lutea,
3 Fœtus in the ovarium.

The following theories have been propoſed to ſhew the manner of conception.

1 A mixture of ſeminal fluids *.

This is ingeniouſly abetted by the COUNT DE BUFFON, who ſuppoſes, that, in conſequence of this mixture of the ſeminal matter, which he thinks abounds with organic molecules or living particles, derived from every part of the parents, the new ſyſtem is organized ac-

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* HIPPOCRATES and other venerable ancients have favoured this doctrine.

cording to determinate laws of attraction, perhaps ſomewhat ſimilar to cryſtallization *.

2 One or more ova or eggs, formed and exiſting in the ovaria, are impregnated by one or more little animals (homunculi) in the male liquor §.

3 The rudiments of the fœtus (germen, ebauche) exiſt in the ovaria, and are excited to life and evolution by the male fluid as a ſtimulus ||.

Theſe hypotheſis are not a little doubtful.

The firſt is the moſt agreeable to the idea of conception being the inſtantaneous effect of the ſexual commerce.

The ſecond, which preſumes the exiſtence of numerous animalcules in the male fluid, to one or more of which the ovum, furniſhed by the female, only affords a nidus or ſituation favourable to growth, is unſatisfactory; becauſe, the generation of theſe animalcules remains to be explained.

The third, which is founded on a pre exiſting germen, labours under the objection ſtated to the ſecond: for the generation of the germen remains to be explained.

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* Hiſtoire Naturelle, tom. ii. chap. iv. The Count has made many expenſive and ſplendid experiments to illuſtrate his peculiar ideas: I ſhall be ſorry if I have miſtaken or diſtorted them.

§ LEWENHOEK, HARVEY, GRAAF, SWAMMERDAM, and others, favour this ſentiment

|| M. M VALLISNERI, SPALANZANI, BONNET, &c. entertain this notion. See SPALANZANI's Diſſertations

The transference of parental likeneſs, and even diſeaſe, are not ſufficiently accounted for, on the ſuppoſition that the ſemen is a mere ſtimulus, and not a conſtituent matter.

Conception is an organizing act, perhaps depending ultimately on attraction; when, therefore, philoſophy accounts for the aſtoniſhing variety of organization and its effects, we may reaſonably expect ſome ſatisfactory theory of this important fact.

Although the human kind is uniparous, there is often a plurality of fœtuſes.

The range is from two to five, the low numbers ofteneſt occur *.

Pregnancy.

Pregnancy, gravidity, or utero-geſtation, is the exiſtence of the fœtus in the cavity of the uterus.

The fœtus, formed in an ovarium, is generally tranſmitted by the uterine tubes to the uterus, to acquire due maturity.

It is not always thus tranſmitted, but remains in the ovarium, in a tube, or drops into the belly, and is extra-uterine.

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* HALLERI Phyſiolog. ſect. DCCCCXXIX. Non raro femina geminos fœtus parit; rarius paulo tres, neque unquam ſupra quinque.

Sometimes, in conſequence of rupture, it takes this laſt ſituation, after it has been lodged in a tube or the uterus.

The child is commonly carried in the uterus two hundred and eighty days, or nine ſolar months, otherwiſe a miſcarriage or abortion is ſaid to happen.

In this point a ſmall latitude takes place.

Three theories are propoſed to explain the nutrition of the fœtus:

1 The liquor amnii ſwallowed and digeſted:

2 The mother's blood carried through continuous veſſels:

3 The mother's fluids abſorbed by the placenta.

The laſt accounts beſt for the phænomena, and is ſupported by analogy.

1 The child lives after the liquor amnii is contaminated or diſcharged:

2 The headleſs fœtus grows:

3 The child remains healthy, although the mother be conſiderably diſeaſed:

4 Continuous veſſels, of which none have been diſcovered, are not neceſſary [*]:

5 The

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[*] I lately was requeſted to inject the veſſels of a woman who died during parturition.

I made uſe of a ſolution of glue blended with vermilion, which many eminent anatomiſts think better calculated to enter the ſmaller veſſels than moſt other compoſitions.

Upon

5 The chick in the egg is fed by abſorption:

6 All animals are nouriſhed by it after birth:

7 Vegetables ſuck their food from the ſoil and air:

8 Paraſite plants abſorb from others.

It is not improbable, that a ſmall quantity of the liquor amnii is ſwallowed from time to time: it may have excellent effects.

The fœtus thus appears not only to have the faculty of attracting its food from the uterus, but of aſſimilating and nutritiouſly applying it; for it grows with aſtoniſhing rapidity, eſpecially during early life *.

Upon careful diſſection, it appeared that not a particle of the injection had entered the veſſels of the placenta or umbilical chord; both which I examined attentively. Some clots of it were found between the uterus and the ſurface of the placenta.

This has been miſrepreſented to Dr. MONRO, becauſe he quotes it as an inſtance of injection having paſſed into the placenta, and even the umbilical chord, in proof of continuous blood veſſels, which, he affirms, exiſt between the uterus and placenta, and are the channels of nouriſhment.

It is ſurpriſing that a gentleman of his ſuperior underſtanding ſhould ſo readily credit an unauthenticated narration: the keenneſs and ambition of ſyſtem, which are ſufficiently powerful to warp the judgment in moſt inſtances, can alone account for it.

A ſacred regard for truth is the onle motive that makes me advert to this matter. I might otherwiſe remain very well contented with the ſeeming honour of having ſucceeded better in the injecting art than any other anatomiſt I have ever converſed with, or heard of.

* HALLERI Phyſiolog.

In general the blood circulates like that of the adult.

The chief peculiarities are,

1 Rate of motion, eſpecially in the placenta, where it is exceedingly ſlow:

2 Tranſmiſſion through the heart and lungs.

The food drawn from the mother is conſiderably animalized, and proportionally freed from excrementitious matter, and therefore affords but a ſmall quantity of

1 Inteſtinal fæces or meconium; none is ejected while in health:

2 Urine; perhaps contained wholly in the bladder and the urachus; the laſt is not continued to the placenta, nor to any alantois or cyſt:

3 Sweat or perſpirable matter; this is blended with the liquor amnii, which perhaps is itſelf a ſecretion from the ſurface of the fœtus:

4 Mephitic matter; which returns to the mother *.

Superfœtation is conception during pregnancy.

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* I have made three experiments on the human fœtus, by tying the chord in two places, and opening the veſſels between the ligatures, in order to diſcover if there be a difference of the colour of the blood in the veins and arteries, and found it more florid in the arteries than in the veins; contrary to what has been ſuppoſed.------See Dr. JEFFREY's Inaugural Diſſer.

Its poſſibility is admitted by reſpectable authority [‖].

The ſuperfœtus may be in,

1 The ſingle and already gravid uterus:

2 The double one, previouſly gravid in one cavity:

3 The uterus, while another fœtus is extra-uterine [*].

Much deception has taken place in this matter.

Monſtroſity is an unuſual conformation of the fœtus.

Luſus naturæ, or deviations from the ordinary ſtructure, which happily are rare, may be

1 Deficiency of head, mouth, ears, arms, &c.

2 Redundancy of head (caput bicephalum), trunk (gemini concreti), arms [§], &c.

3 Obſtruction

[‖] Halleri Phyſiolog. § dcccccxxix. Non dubium eſt, poſſe ſecundum ſetum concepi dum prior in utero eſt, &c.

[*] Plenck's Elem. Art. Obſt. p. 90.

[§] A bairn was born, reckoned to be a man-child; but, from the waſte up, was two fair perſons, with all members and portraitures pertaining to two bodies, two heads well-eyed, well-eared, and well-handed. The two bodies, the one's back was faſt to the other's; but, from the waſte down, they were but one perſonage, and could not know by the ingine of man, from which of the two bodies the legs and privy members proceeded. Notwithſtanding the King's Majeſty cauſed take great care and diligence upon the upbringing of two bodies in one perſonage, cauſed nouriſh

3 Obſtruction of the rectum, &c. or anus imperforatus, &c.

4 Concretion

nouriſh them, and learn them to ſing and play upon inſtruments of muſic; who, within ſhort time became very ingenious and cunning in the art of muſic; whereby, they could play and ſing two parts; the one on the treble, and the other on the tenor; which was very dulce and melodious to hear. The common people, who treated them alſo, wondered that they could ſpeak diverſe and ſundry languages; that is to ſay, Latin, French, Italian, Spaniſh, Dutch, Daniſh, Engliſh, and Iriſh. Thir two bodies long continued, to the age of twenty-eight years; and the one departed long before the other, which was dolorous and heavy to the other; for which many required of the other to be merry. He anſwered, "How can I be merry, that have my true marrow as a dead carrion about my back, which was wont to ſing and play with me. When I was ſad, he would give me comfort, and I would do the like to him. But now I have nothing but dolour of bearing ſo heavy a burden, dead, cold, and unſavoury on my back, which taketh all earthly pleaſure from me in this preſent life: therefore I pray to Almighty God, to deliver me out of this preſent life, that we may be laid and diſſolved in the earth, wherefrom we came."

There was a bairn born which had both the kinds of male and female, called in our language a Scarcht, in whom man's nature did prevail; but becauſe his diſpoſition and portraiture repreſented a woman, in a man's houſe in Linlithgow, he aſſociated in bedding with the goodman's daughter of the houſe, and made her to conceive a child. Which being devulgate through the country, and the matrons underſtanding this damſel deceived on this manner; and being offended that this monſtrous beaſt ſhould ſet himſelf forth for a woman, being a very man, they get him accuſed and convicted in judgment, for to be burnt quick for this ſhameful behaviour.—LINDSAY OF PITSCOTTIE's Hiſtory of Scotland, p. 160, 164

A tradeſman's wife at Roberſbridge in Suſſex, was delivered of a child who had two heads, four thighs, four legs, and four feet, but only one body. Some ſmall ſigns of life were diſcovered in one of the heads, which almoſt inſtantly vaniſhed.

VAN

4 Concretion of the ſingers, &c. or webbing, &c.

5 Malformation of the lip, foot, &c. hence hare-lip, club foot, &c.

Till the generation of the perfect animal be accounted for, it muſt be highly abſurd to offer any theory reſpecting monſters.

Referring them in any degree to the working of the mother's imagination, is not only ridiculous but pernicious; becauſe they occur among brutes, birds, and other orders of animals, and even among vegetables.

Parturition.

This is the expulſion of the mature fœtus from the uterus.

This event and its accidents are the grand objects of midwifery; here, however, they are to be conſidered merely in a phyſiological light.

Parturition is preceded by

1 A mucous diſcharge;

2 An irkſome ſenſation about the os internum;

VAN DOVERN has written a Treatiſe on monſters of various kinds

WALTER has publiſhed a diſſection of the double fœtus. ---See Obſervat. Anatom.

Dr. MONRO has done the ſame.-- See Nervous Syſtem.

3 Altered ſhape of the belly ;
4 Membranous ſtate of the os internum ;
5 Dilatation of the os internum ;
6 Laxity of the vagina and os externum.

It is attended with

1 Pains in the loins and adjacent parts, increaſing at intervals ;

2 Teneſmus, or downward preſſure, accompanying the pain, and proportioned to it ;

3 Tenſion of the belly, and retention of the breath, during the pain ;

4 Diffuſed pain about the pelvis when the body is moved ;

5 Deſire to void the urine and fæces, even when there is no accumulation ;

6 Dilatation of the os internum, increaſed during a pain, ſo that the chorion may be felt.

Pains not of this deſcription are called falſe (dolores ſpurii).

When true and falſe concur, they are mixed pains (dolores mixti).

Parturition takes place with wonderful exactneſs at the expiration of the term of pregnancy, notwithſtanding the very different ſizes of mothers and children.

A degree of variation is ſometimes to be marked *. An anticipation is premature birth

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* HALLERI Phyſiol. §. DCCCCXXVII. Tempus partus nonio ſolaribus menſibus emenſis ingruit, in omnibus animalibus perinde definitum, etſi alquot ſeptimanis per ſuas cauſas, aut accelerari poteſt, aut retardari, &c.

(partus præmaturus). A protraction is poſt-mature delivery (partus ſerotinus)*. The exciting cauſe is unqueſtionably an irritation often depending on diſtenſion; in conſequence of which the reſpiratory and abdominal muſcles are thrown into ſtrong action, whereby the uterus is compreſſed, and the os internum diſtended: this conſtitutes and is called a labour-pain or throe.

The pain, ſtrictly ſpeaking, which occaſions the complaining or crying, is the effect of the diſtenſion.

The contractility of the uterus, comparatively weak, is not ſo efficient as has been commonly ſuppoſed §; and does not by any means reſemble muſcular action ||.

The labour-pains become more and more frequent and ſtrong, propel the head or other part of the child toward the os internum.

The membranes, eſpecially during a pain, become tenſe, like a bladder filled with water, and protruded through the os internum, now conſiderably enlarged. Unſupported at this point, they burſt, and the liquor amnii is ſuddenly diſcharged; an event called by the women the breaking of the waters.

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* PLENCK's Elem. Art Obſt.

§ HALLERI Phyſiolog. § DCCCXXVII. Uterus contractili vi fœtum conſtrictus urget, qui ſolus etiam abſque nixu matris, fœtum non-nunquam expellit.

|| See Dr. J. G. WALTER's Treatiſe de Morbis Peritonæi.

The pains increaſe for the moſt part after the rupture of the membranes; becauſe the head, which is the part commonly preſented, is more cloſely applied to the os internum, and thus gives more irritation than formerly.

The head, with its vertex undermoſt, and the face turned to the mother's ſide, paſſes the brim of the pelvis, when it is ſaid to be in the bones, and ſhivering fits frequently enſue.

The reſiſtance at the poſterior part, and ſides of the pelvis, on account of the depth, turns the vertex towards the os externum, and the face towards the cavity of the os ſacrum.

The vertex ſoon diſtends the os externum and perinæum, like a great tumour, ſo that the anus is dilated, and the rectum emptied: it then moves forwards and upwards, and the face emerges from the perinæum as from behind a large valve, and the head is born.

The mother's cries, during this event, are exceedingly ſtrong, and expreſſive of the racking anguiſh ſhe ſuffers.

The trunk and limbs, in conſequence of the proceding contraction, are ſoon expelled.

The child is entirely paſſive during parturition; conſequently it is as readily born when dead, as when alive.

About a pound of blood is ſuddenly diſcharged after the expulſion of the child, which ſeems to have been gradually poured out from the uterine veſſels during the latter part of the proceſs.

Parturition is not completed till the afterbirth be diſcharged, becauſe it is a part of the fœtal ſyſtem.

The placenta, already ſomewhat diſengaged, before the child be expelled, is gradually looſened entirely, and thrown off by the uterine contraction chiefly.

This is effected with various expedition; moſt commonly within an hour or two; and is ſucceeded by a diſcharge of blood, often exceeding the quantity formerly effuſed.

This hæmorrhage gradually ſubſides, and for the moſt part diſappears within two or three days: it is termed lochia, and lochial flux.

Parturition is commonly finiſhed within twelve hours, a day, or a day and a half; it is rather tedious, if it be protracted through two days.

When the lochial flux has abated, the breaſts begin to be more or leſs painful, hard, and ſwollen, and ſometimes fever (febris lactea) ſucceeds.

Theſe effects reſult from the change of the milk glands, now proceeding rapidly in their proper function.

Reſpiration.

Reſpiration or breathing is one of the moſt important functions, and in general eſſential to the living condition after birth.

In conſequence of the thorax being enlarged by the contraction of the intercoſtal muſcles and diaphragm, a portion of atmoſpheric air ruſhes into the bronchial tubes, that collectively may be conſidered as an empty bladder placed in a vacuum. This is called inſpiration.

The muſcles dilating the thorax ceaſing to act, and thoſe contracting it making an exertion, aſſiſted by the reaction of the cartilages and ligaments of the ribs, it recovers its unconſtrained diſpoſition, and as much air is expelled as had been taken in during the preceding inſpiration. This is termed expiration *.

The alternate ſucceſſion of inſpiration and expiration is named reſpiration.

The lungs of the fœtus are comparatively denſe, and of ſmall volume, and ſeemingly do not fill the pleuritic cavities till reſpiration commence; when the circumambient air, by its preſſure, inſinuates itſelf and gives ſuch diſtenſion as carries the pulmonary and coſtal pleuræ into mutual contact. A ſufficient quantity of air for this purpoſe is always preſent in the healthful lungs, which, in the full-ſized adult, amounts to 262 cubic inches. When inſpiration takes place 6 cubic inches of additional air is inhaled, and thus the whole is equal to 268 inches: a calculation that admits of variation from ſize *, &c.

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* Dr. GOODWIN has propoſed an accurate method of weighing and aſcertaining the quantity of air inſpired, and has publiſhed an elegant deſign of the balance employed. See Inaugural Diſſertat. de Merbo mortique ſubmerſorum inveſtigandis.

Reſpiration favours,

1 The circulation of the blood through the lungs: the dilatation which they attain unqueſtionably facilitates the tranſmiſſion of the blood, although experiments ſhew it is not eſſentially neceſſary:

2 The diminution of animal heat:

3 The diſcharge of vapour or halitus, which ſeems to be emitted by exhalant veſſels ſimilar to thoſe in the cutaneous ſurface, by which the perſpirable matter eſcapes:

4 The abſtraction of fixed or mephitic air, for which there are perhaps peculiar ſecreting veſſels on the ſurface of the veſicles:

5 The introduction of pure or dephlogiſticated air, which is eſſential to the vital condition.

It is now generally admitted, that atmoſpheric air is an heterogeneous or mixed body: a hundred parts of it contains of

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* See Dr. GOODWIN's Inaugural Diſſertations, already quoted.

	Parts.
Phlogiſticated air	80
Pure air,	18
Fixed air,	2
	100

When this is expired the proportion and quantity are varied thus:

Phlogiſticated air,	80
Pure air,	5
Fixed air,	13
	98

The florid colour which the blood acquires in the lungs, and retains in the arteries, is communicated entirely by this pure air, which may almoſt be conſidered as the fuel of the vital flame; for life languiſhes when this is withheld, as in drowning, hanging *, &c.

It may be obſerved, that the effect of this pure air may perhaps be ſomewhat aſcribed to its preventing the fixed air, which ſeems to be highly deleterious, from injuring the ſyſtem.

Animal Heat.

Animals in general poſſeſs a temperature ſuperior to that of the ſurrounding atmoſphere, which is called animal heat.

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* Dr. GOODWIN's Diſſertation, p. 40.

The large animals whoſe blood is red, have a temperature equal to 96 degrees of FARENHEIT's thermometer, with little variation; which is conſiderably above the ordinary ſtate of the atmoſphere.

The ſource of animal heat is a ſubject of much phyſiological diſpute. While one phyſiologiſt aſcribes it to friction of the fluids on their veſſels, another contends that it is phlogiſton evolved from the fluids by vaſcular action.

As to the firſt opinion, facts are wanting to ſhew that a friction can take place between fluids and ſolids capable to produce heat; and the ſecond is exceedingly doubtful, as nothing fixed with regard to phlogiſton is yet determined by the chemiſts.

Many reaſons may be alledged to make it probable that animal heat is derived from the air in the lungs, or from the atmoſphere, perhaps in conſequence of a chemical action between the blood and the air. Thus it is contended, that the blood gives out phlogiſton, which unites with air ſo as to expel its fire, and that this is attracted by the blood, in conſequence of ſuperior affinity; or, in other words, a double elective attraction is continually going on, connected with reſpiration, or any analogous action in animals.

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* See CRAWFORD on Animal Heat.

It muſt be admitted that this theory is exceedingly beautiful, and a good deal ſupported by the conſideration of the mutual action of elementary bodies on one another ſo generally obſervable. Much information, however, is as yet wanted on this point.

Whatever be the cauſe of animal heat, one circumſtance is moſt certain, viz. that it is very generally proportioned to vaſcular action; hence its increaſe during exertion, and many diſeaſes, ſuch as fever.

It has lately been obſerved, that Nature has endowed animals with the a power of reſiſting heat; as it appears that life can be ſupported in a temperature of the air conſiderably beyond the boiling point. Perhaps evaporation is much concerned in this remarkable phænomenon, on which the preſervation of life may often depend.

THE END.

PRINCIPLES

OF

OSTEOLOGY,

OR

THE ANATOMY

OF THE

HUMAN BONES.

Interſperſed with Chirurgical Remarks, and illuſtrated with Copper-Plate Engravings, drawn from Nature, or copied from the Works of the greateſt Maſters.

For the Uſe of STUDENTS.

By JOHN AITKEN, M. D.

Fellow of the Royal College of Surgeons, &c. and Lecturer in Anatomy and Surgery, and Midwifery, in Edinburgh.

EDINBURGH.

MDCCLXXXV.

ADVERTISEMENT.

THE following pages contain part of a work, entitled *Principles of Anatomy and Phyſiology*, ſoon to be publiſhed.

It was the wiſh of the Author to give ſuch a conciſe, ſimple, and practical view of this fundamental part of Anatomy as might render it acceptable, at leaſt, to beginners.

The Engravings are accurate, and greatly illuſtrate the verbal deſcription.

Edinburgh, Nov. 2. 1785.

TABLE W.

A View of the Blood Veſſels on the Neck and Head, of the natural adult Size--by HALLER.

A A Trunk of the external jugular vein, which ariſes principally from the parotid gland.

B B Parotid gland, appearing ſomewhat lobular.

C C The facial vein, correſponding to the facial artery, ending below the jaw in the internal jugular vein.

D Situation of the common carotid, marked by dotted lines, as alſo that of

E Internal carotid artery, tending to its proper hole to reach the brain.

F External carotid, giving off the following great branches:

G Sublingual artery;

H Facial artery, that becomes ſuperficial at the baſe of the jaw, and is divided into,

a a Mental or maxillary artery;

b b Inferior lateral artery;

c c Superior lateral artery.

I I Occipital artery, which becomes ſuperficial on the occiput.

K Trunk of the temporal arteries, covered by the parotid gland.

This trunk is divided into temporal and frontal branches, which beautifully anaſtomoſe with one another, with the angular and occipital arteries.

x

Fig. 1.

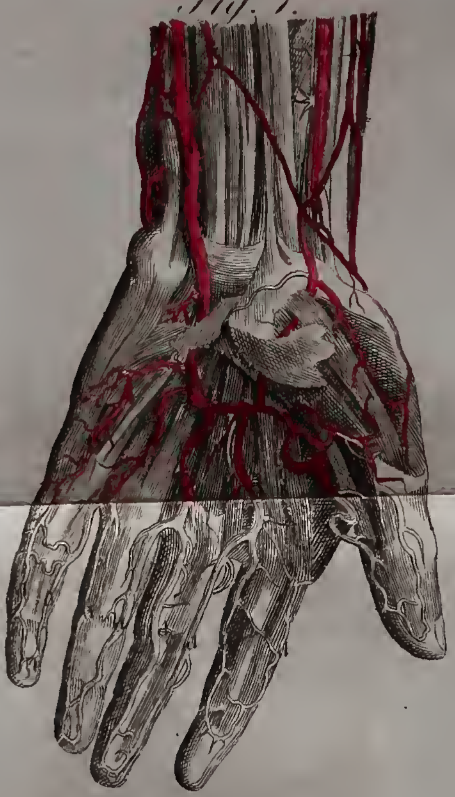

Fig. 2.

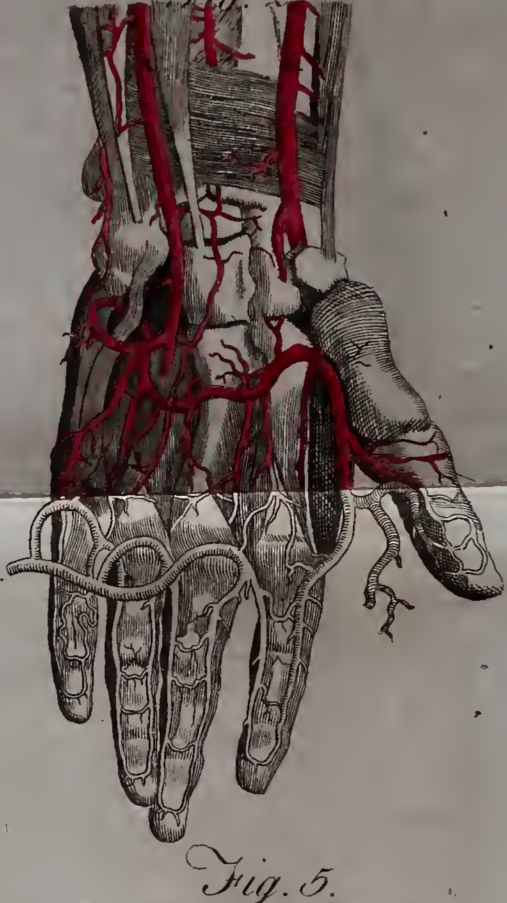

Fig. 3.

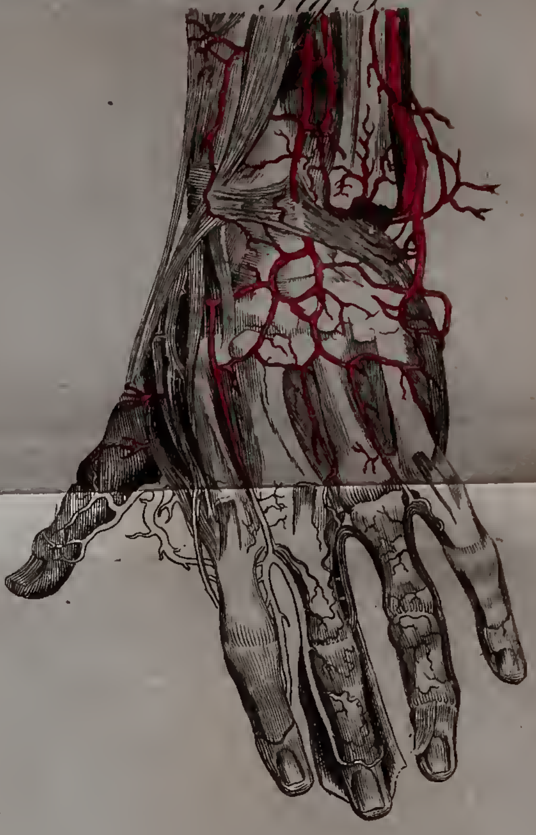

Fig. 4.

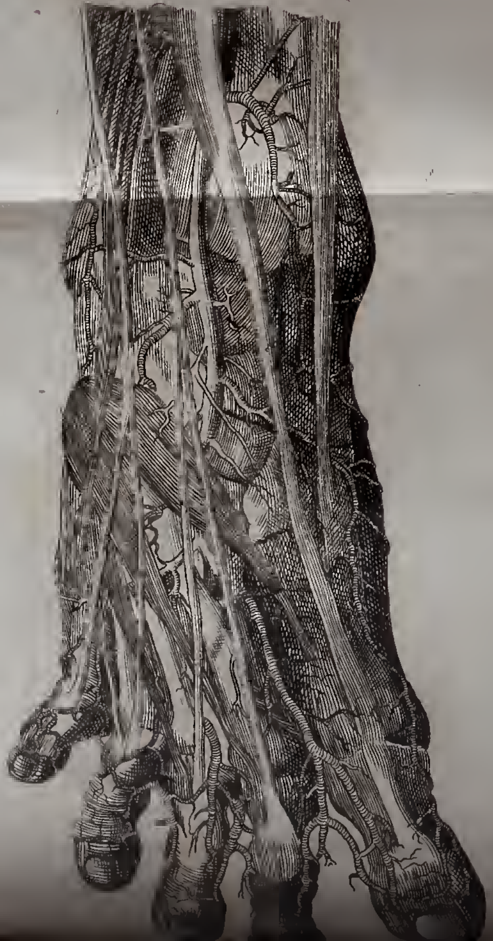

Fig. 5.

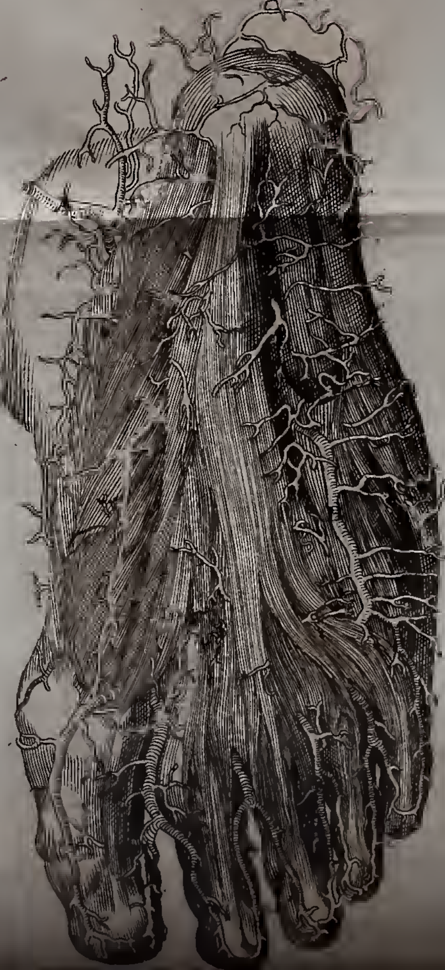

Fig. 6.

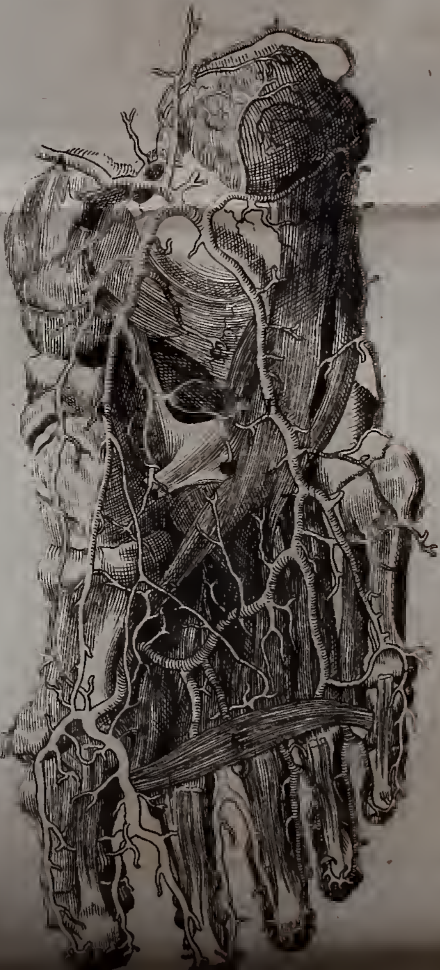

TABLE X.

A View of the principal Arteries of the Hands and Feet---by HALLER.

FIG. I.

Exhibits thoſe of the inferior Part of the Fore-arm and Palm of the left Hand, both without the Integuments, and the latter without the Palmar Aponeuroſis.

A Radial artery.
B Ulnar artery.

C C Palmar arterial arch, formed by the union of the radial and ulnar arteries, from the convexity of which diverging branches, D D D D, deſcend to the fingers; three of theſe are each divided into two branches d d d d, that run down along the ſides of the fingers or ſheaths of their flexor tendons.

The veins have nearly a ſimilar courſe.

FIG. II.

A View of thoſe of the upper Part of the left Fore-arm and Hand.

A The radial artery; its trunk ſinking above the thumb to the ſpace between it and the fore finger.

B The ulnar artery paſſing downwards behind the palmar aponeuroſis (here removed) to form

CC The palmar arch, from which the diverging or digital branches are cut and drawn downwards, to ſhew the deep ſeated branches.

FIG. III.

A View of the Arteries on a Part of the left Fore-arm and Hand, the Integuments, Tendons, &c. removed.

A Branches from the external interoſſeous arteries.

B Continuation of the radial artery.

C Branches from the ulnar.

Theſe anaſtomoſe variouſly with one another, and with thoſe of the palm.

FIG. IV.

A View of the Arteries of the upper Part of the right Foot.

A The trunks of the tibialis antica, a little above the ankle, is continued downwards, and ramified principally below the tendons of the extenſors; the extreme branches ſupply the tendons of the toes.

FIG. V.

A View of the Arteries on the Sole of the right Foot, ſeen after the Integuments are removed.

A Continuation of the trunk of the tibialis poſtica below the ankle.

B External plantar artery.

FIG. VI.

A View of the Arteries on the Sole, ſeen after the Integuments and Flexor Muſcles are removed.

A Continuation of the trunk of the tibialis poſtica.

B External plantar artery.

C Internal plantar artery.

D The plantar arterial arch that gives off branches to the toes, like the palmar arterial arch to the fingers.

E Tranſverſalis pedis muſcle.

Pl. I of Lymph

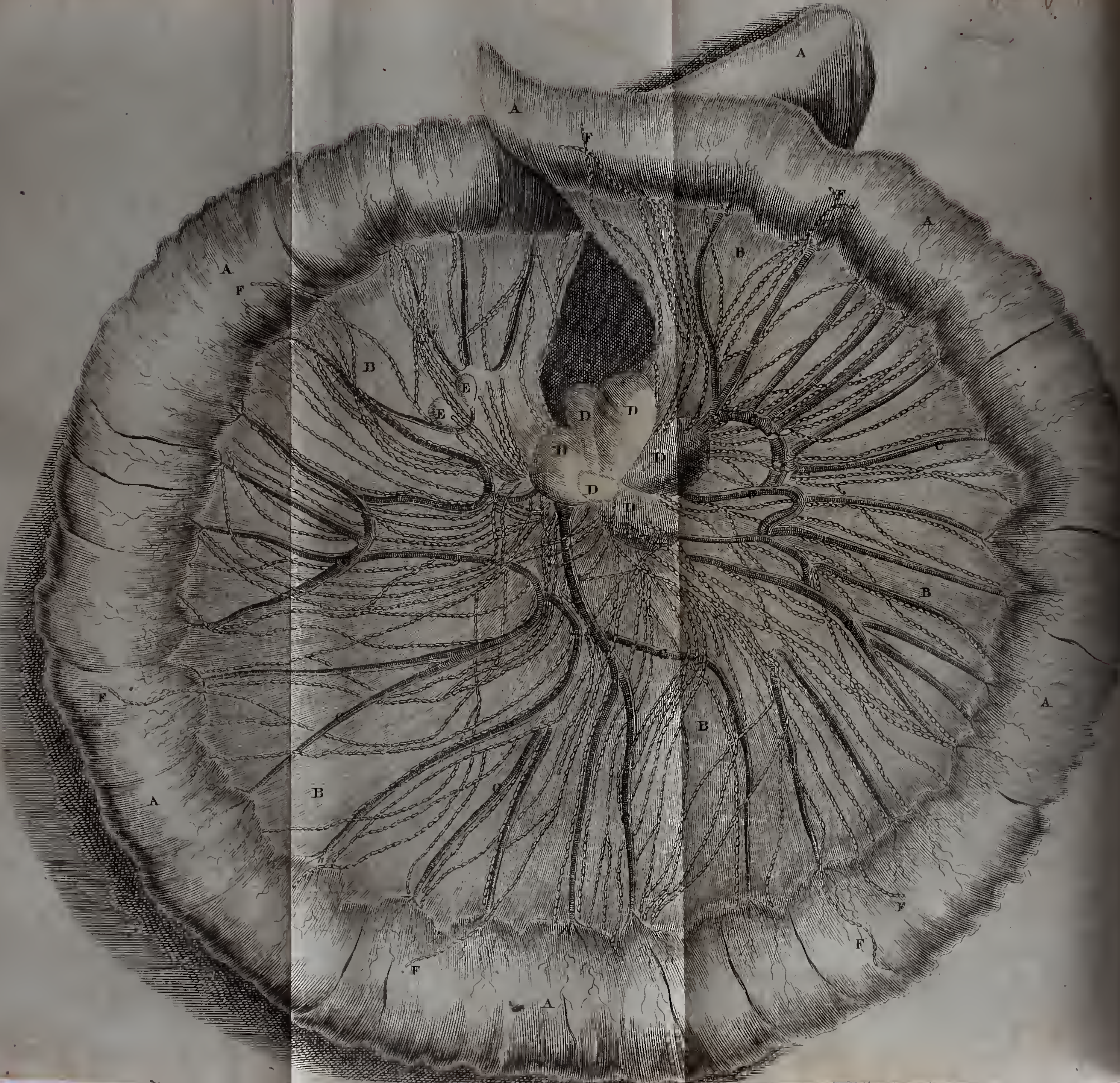

TABLE Y. Plate Ist of S

A View of the abſorbent Veſſels called Lacteals, beautifully filled with Chyle; painted from thoſe of a Man who died on his Wedding-day of Surfeit and Intoxication.

A A, &c. Aperture of the ſmall inteſtine, its cut extremeties lapping over one another, and ſo ſpread as to ſhew the correſponding piece of the meſentery, &c.

B B, &c. The meſentery in thoſe places in which there are no veſſels.

C C C, &c. The meſenteric arteries and veins, the former going to, and the latter returning from the inteſtine, beautifully anaſtomoſing and forming arches.

D D D, &c. A cluſter of meſenteric and conſequently conglobate glands of a ſecondary ſize.

E E Small meſenteric glands.

F F, &c. Apparent beginnings of the lacteals; they are not nearly ſo longitudinal with reſpect to the inteſtine as thoſe in the following figures, but the number is greater, and perhaps it is ſtill inferior to nature.

The little interruptions mark the numerous valves, which perhaps are upon the whole nearer than they ought to be.

Many of the lacteals enter the body of the glands directly, while others mount ſo far on their ſurface before they penetrate.

I lament exceedingly that I was not allowed to examine the lacteal ſyſtem more extenſively. The friends and neighbours of the unhappy man, who were preſent, were much prejudiced, and very watchful.

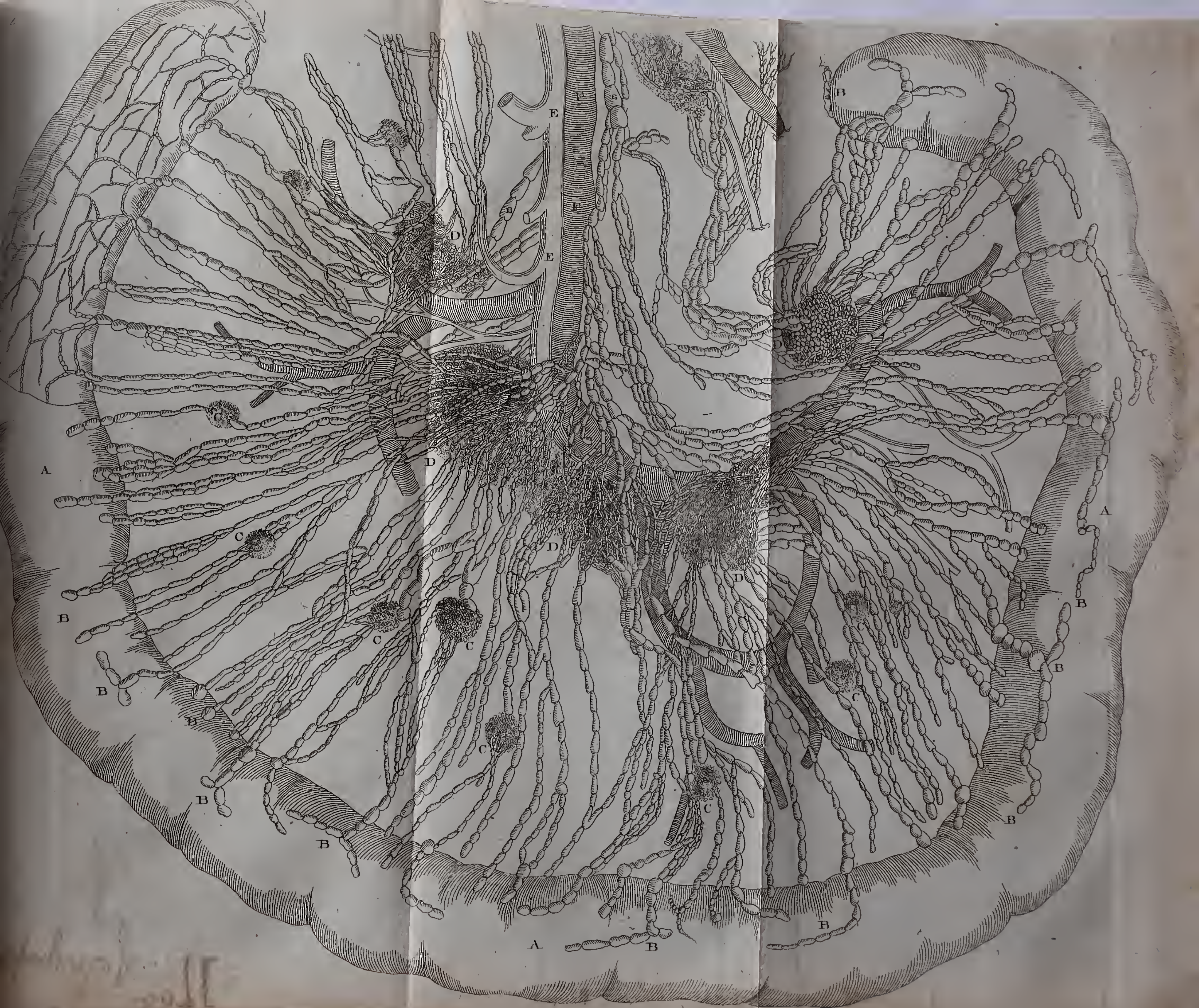
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TABLE Z. IInd of Lymph

A View of a conſiderable Share of the Lacteal Veſſels filled with Quickſilver--by WERNER and FELLER.

A A A A portion of the ſmall inteſtine, with its extremities tied.

B B B, &c. The lacteal trunks as they emerge from the inteſtine, but covered by the peritonæal coat. They converge beautifully in their courſe to the root of the meſentery, and are ſubdivided with ſurpriſing minuteneſs as they paſs through the conglobate glands.

C C, &c. Small glands.

D D, &c. Large glands.

E E Trunk of the inferior meſenteric artery.

F F Trunk of the inferior meſenteric vein, or vena portarum, near which the lacteals form larger trunks, a a, about to produce the receptaculum chyli from a ſmall part of the inteſtine.

On the left the peritonæum is diſſected to ſhew the lacteals near their beginnings, running in various directions, and forming many anaſtomoſes before they unite into the trunks ſeen on the ſurface.

II

Tabl. A A iiird of Lymphatics

AA

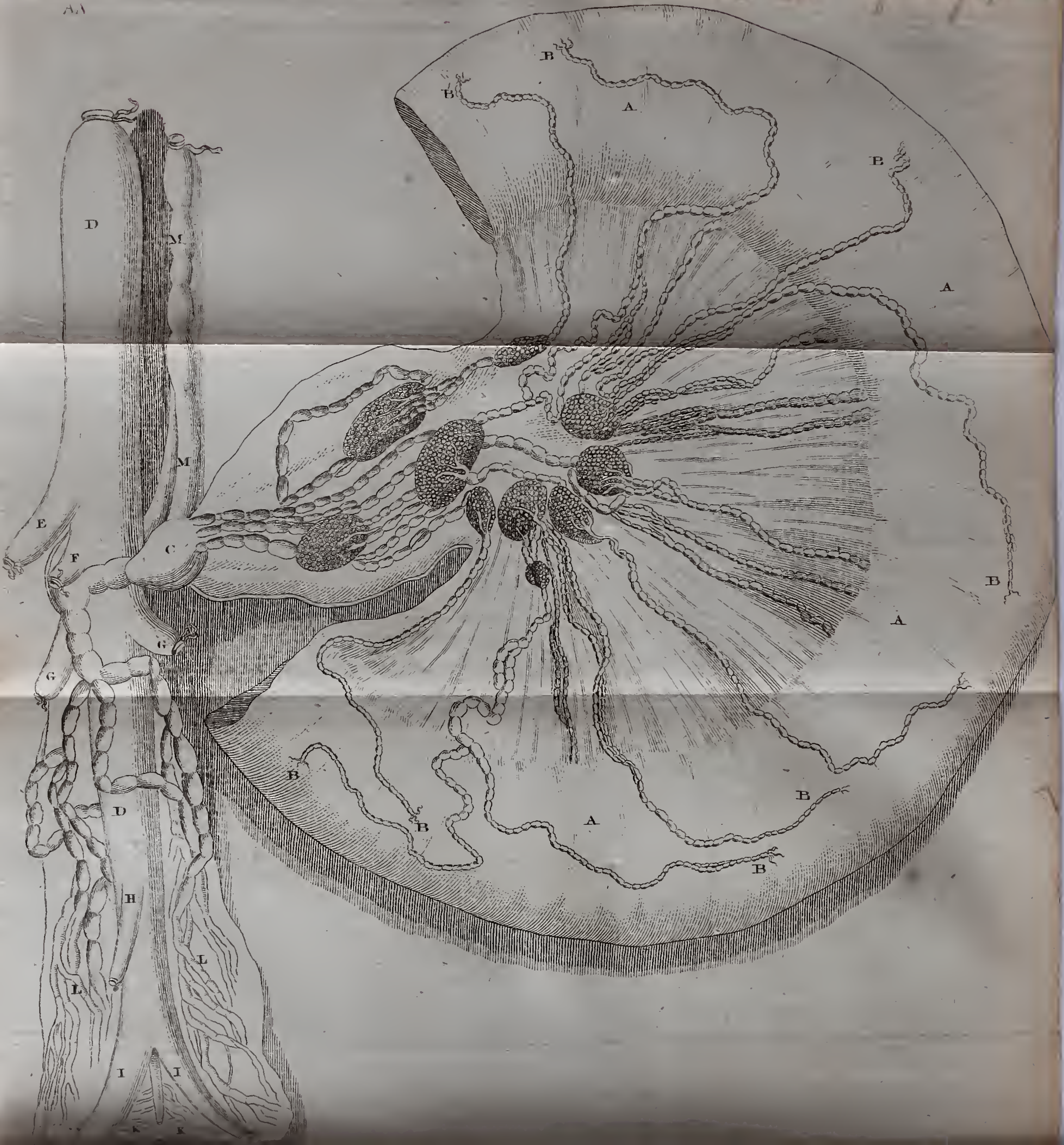


TABLE AA.

IIIrd. [illegible]

A View of the Lacteal Veſſels through their whole Courſe, and of their Union with the Lymphatic Syſtem in general in the Receptaculum Chyli and Thoracic Duct-------by SHELDON.

A A, &c. A portion of the inteſtine with its meſentery.

B B, &c. The beginnings of the lacteal trunks, tied at the points, into which the injecting tube had been inſerted: their courſe is converging and ſerpentine; they are not repreſented ſo diſtinctly ramified in the glands as in the former figure.

C The receptaculum chyli in which the lacteals end.

D D Trunk of the aorta.

E Trunk of the cœliac artery, immediately below the diaphragm.

F Trunk of the ſuperior meſenteric artery.

G G Trunks of the emulgents or renal arteries, near which the lacteals fall into the receptaculum chyli.

H Trunks of the inferior meſenteric artery.

I I Common iliac arteries, which divide nearly opoſite to the laſt lumbar vertebra.

K K A plexus of lymphatics.

L L Lymphatics aſcending from the legs, &c. to reach the receptaculum chyli.

M M The thoracic duct, aſcending in the courſe of the ſpine.

Tabl. B.B. IV.th of the Lymphatics

Fig. 1.

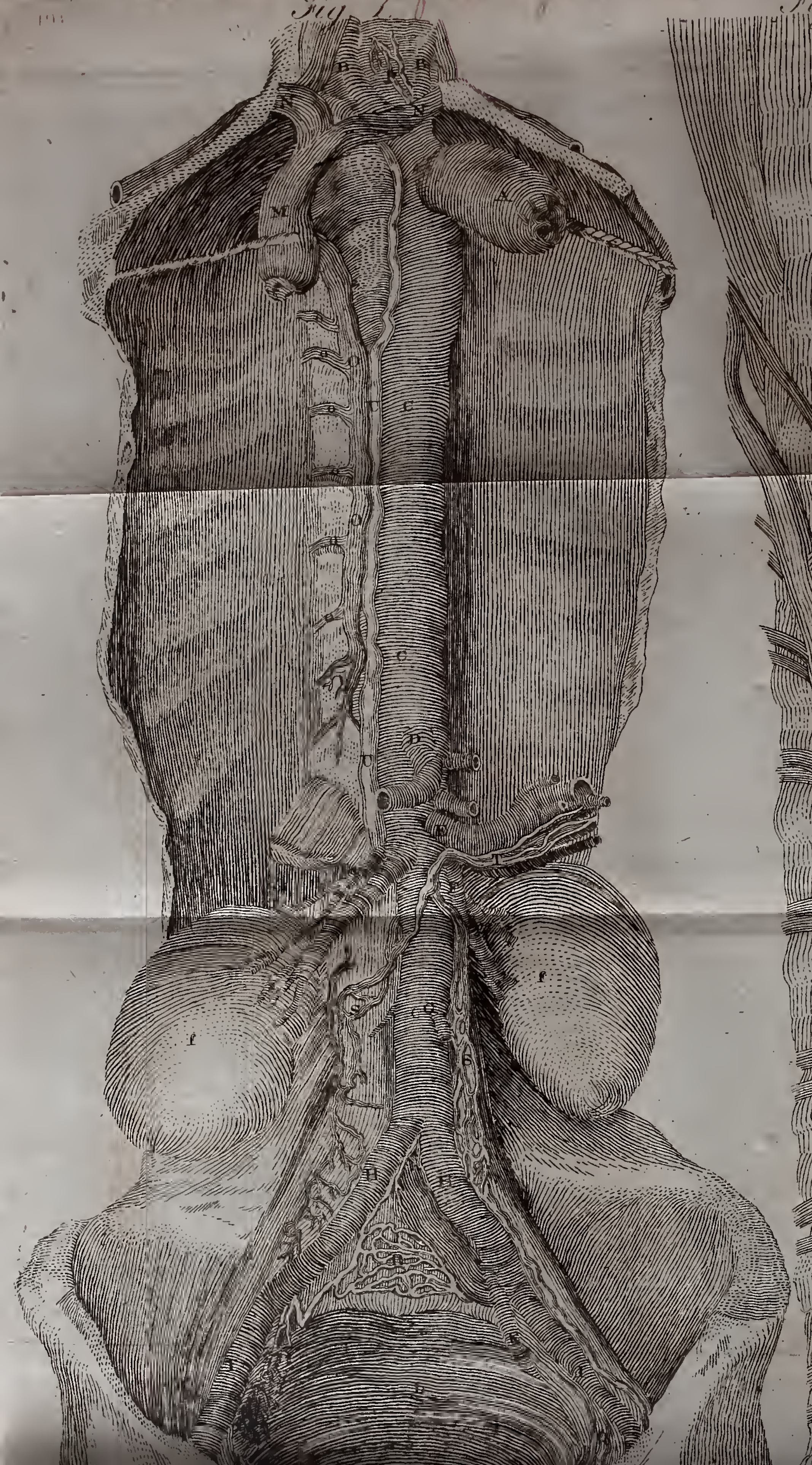


Fig. 2.

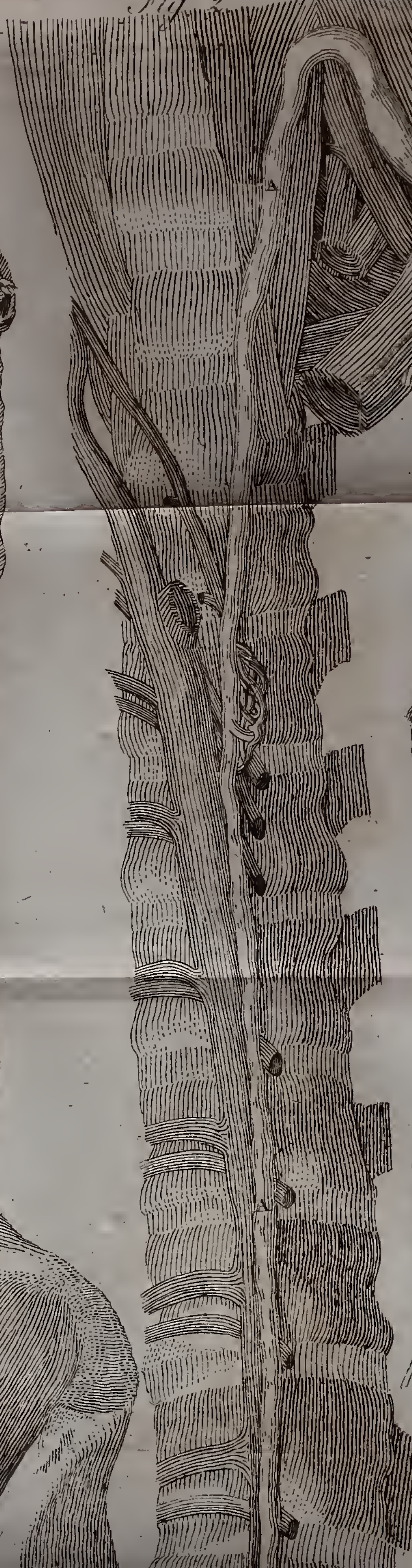


Fig. 3.

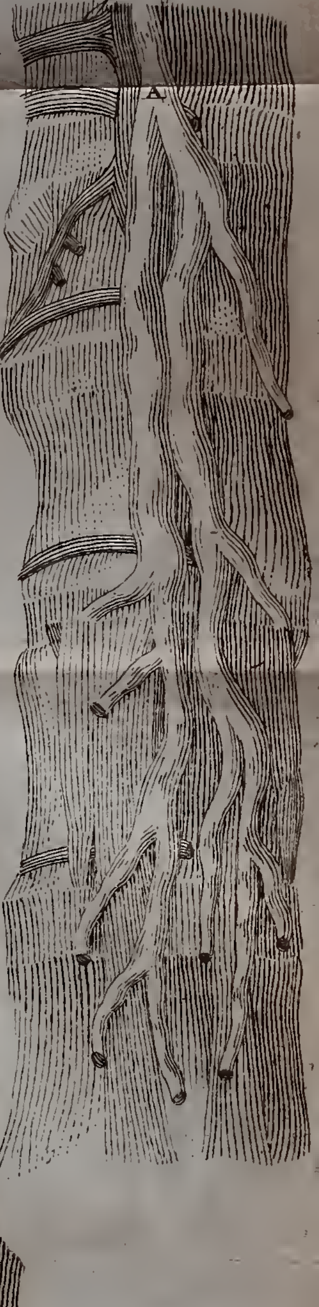


TABLE BB. IV. of the Lym

A View of the Adunation of the principal Lymphatic Veſſels in the Thoracic Duct, and of this Duct itſelf.

FIG. I.

A front View of the Trunks of the Body, after the anterior Segment of the thoracic and abdominal containing parts, and all the viſcera except the Kidnies, have been removed.

A The trunk of the aorta cut off juſt where it emerges from the left ventricle of the heart, and tied to the left ſide by the ſtring a.

B B Common carotid arteries.

C C The aorta deſcending along the ſpine within the cheſt.

D Trunk of the cœliac artery, ſent off from the aorta immediately below the diaphragm.

E Trunks of the ſuperior meſenteric artery, and ſome portion of its branches.

F F Emulgent arteries going ſlantingly to the kidnies, f f, of which the right one is a little lower than the left.

G Trunk of the inferior meſenteric artery.

H H Common iliac arteries.

I I External iliac arteries.

K Internal iliac artery of the left ſide.

L The fundus of the urinary bladder.

M The ſuperior vena cava, cut from the right auricle of the heart, and turned ſomewhat to the right ſide by the cord m.

N N The ſubclavian vein of the left ſide longer than the other.

O O The vena azygos running up along the right ſide of the ſpine to the ſuperior vena cava, in which it ends; receiving the intercoſtal veins, o o o, in its way.

P Lymphatics deſcending from the neck and ſuperior parts.

Q Q Lymphatics from the inferior parts, ſeen on each ſide of the bladder.

R A plexus of lymphatics at the lower part of the lumbar region.

S S Lymphatic trunks, forming various anaſtomoſes.

T Lacteals lying along the ſuperior meſenteric artery, in their way to the receptaculum chyli, behind the right emulgent artery, where they fall in with the lymphatics from the inferior parts.

U U The thoracic duct, or common lymphatic trunk, running up to the left ſubclavian vein, which it enters near the termination of the internal jugular vein.

The upper part of this duct inclines to the left; this deflection is behind the heart: it then paſſes behind the arch of the aorta, which is drawn aſide to ſhew the top of the duct.

FIG. II.

A View of ths Thoracic Duct, from the Diaphragm nearly to its Termination in the left Subclavian, as large as Life----by ALBINUS.

A A Truuk of the duct, the upper part of it making a curvature before it ends in the left ſubclavian vein.

C Subdiviſions of the duct ſometimes obſerved, eſpecially where the thoracic lymphatics fall into it.

FIG. III.

A View of the inferior Part of the Thoracic Duct, and its Formation.

A The receptaculum chyli, or beginning of the thoracic duct.

Table CC, Vth of the Lymphatics

Fig. 1.

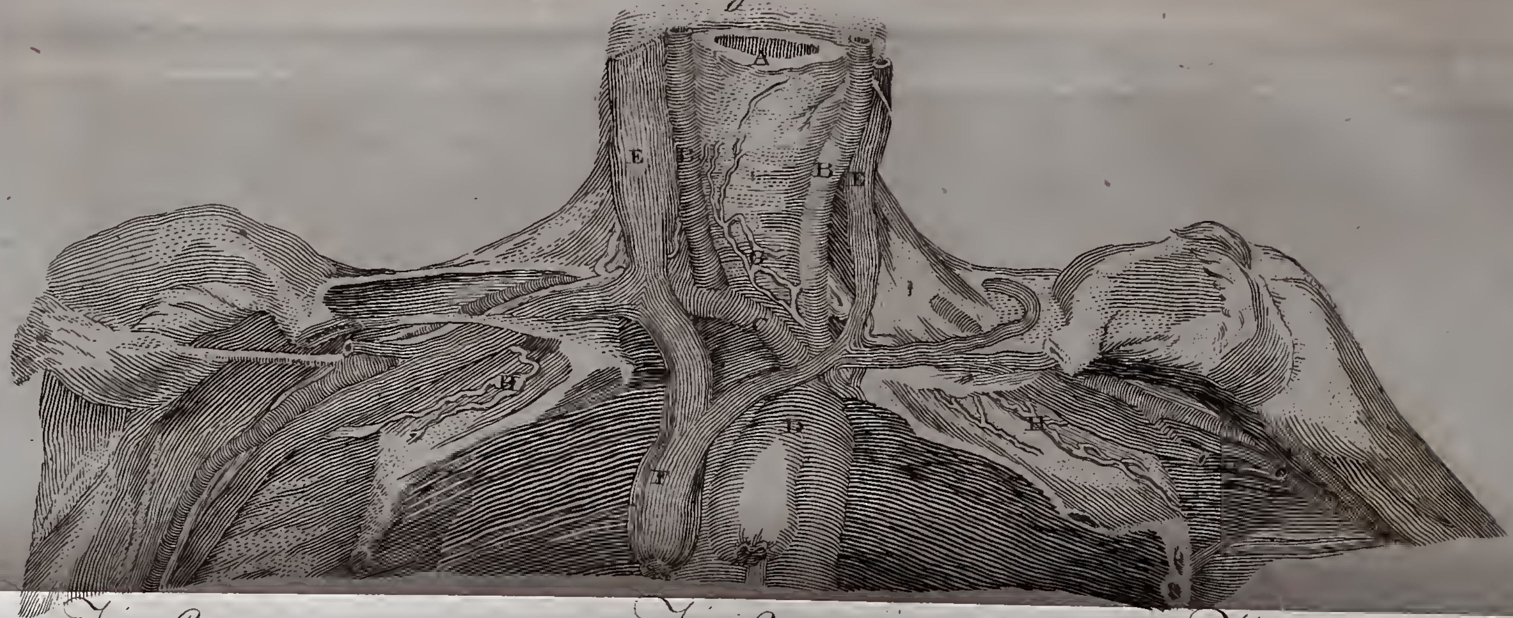


Fig. 2.

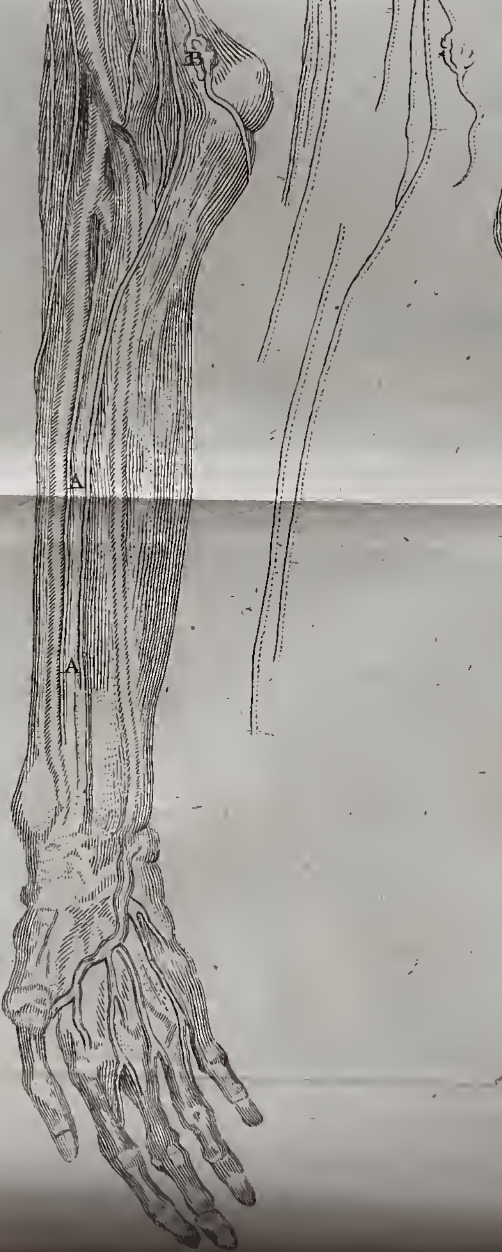


Fig. 3.

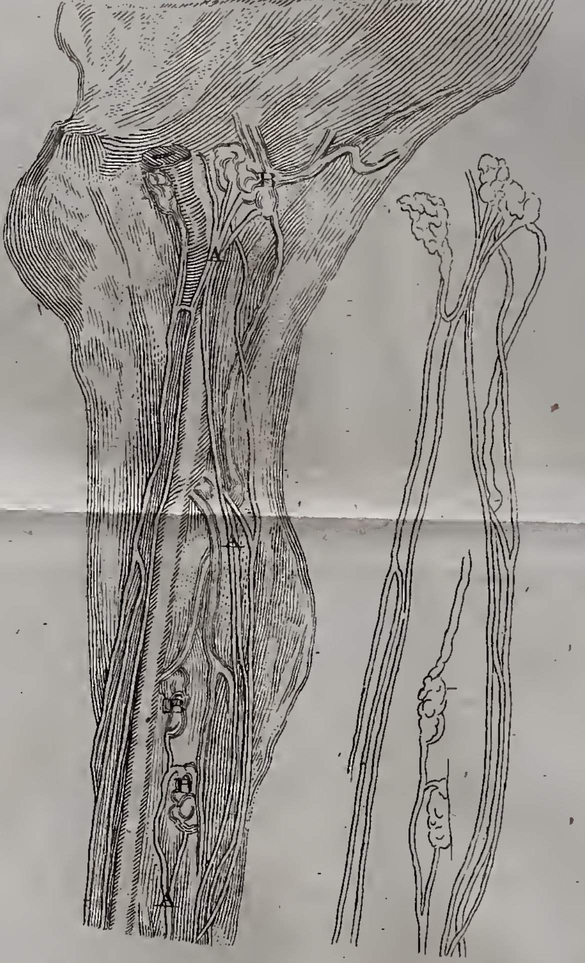


Fig. 4.

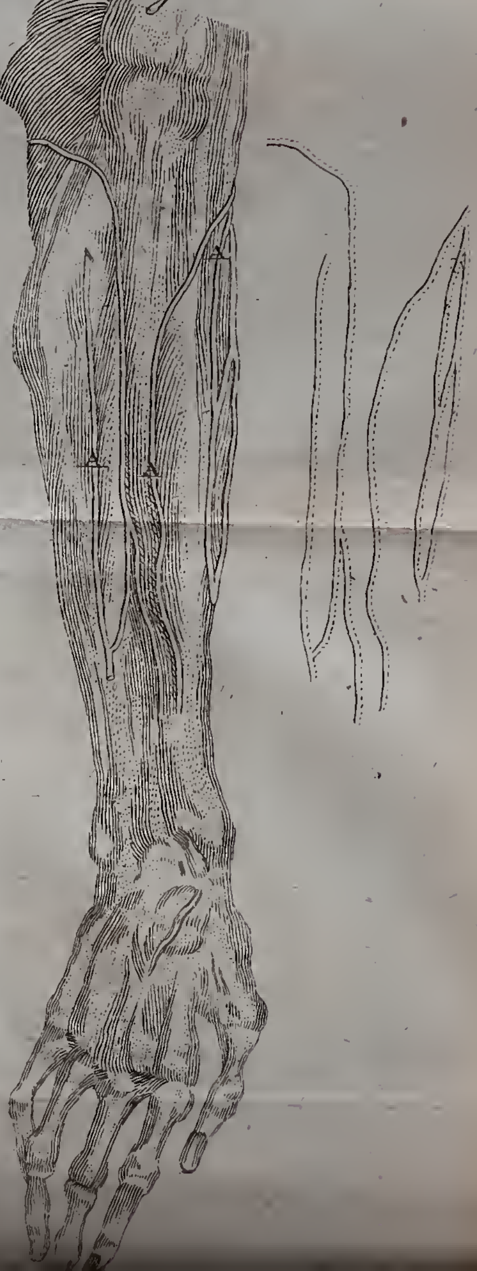


TABLE CC. Vth. of the lym

FIG. I.

A View of a Diſſection of the upper Part of the Cheſt----by HEWSON.

A Trachea cut acroſs below the larynx.

BB The trunks of the carotid arteries running along the ſides of the trachea.

C Common trunk of the right carotid and ſubclavian arteries.

D Arch or ſuperior part of the aorta.

EE Internal jugular vein.

F The vena cava ſuperior cut from the auricle.

G Lymphatics deſcending on the neck.

HH Lymphatics from the arms.

FIG. II.

A View of the ſuperficial or cutaneous Lymphatics of the fore Part of the left Fore-arm and Hand----by HEWSON.

AA Principal Lymphatics running upwards.

B Lymphatic gland above the elbow, near the internal condyle.

FIG. III.

A View of the Lymphatics of the inſide of the Arm, above the Elbow----by HEWSON.

A A A Principal lymphatics, forming frequent anaſtomoſes.

B B B Lymphatic glands, the uppermoſt in the axilla.

FIG. IV.

A View of the Lymphatics on the back Part of the right Fore-arm and Hand---by HEWSON.

A A A Principal lymphatic trunks, which, above the elbow, incline inwards.

Tab. D D. VI q. in Lymphatics.

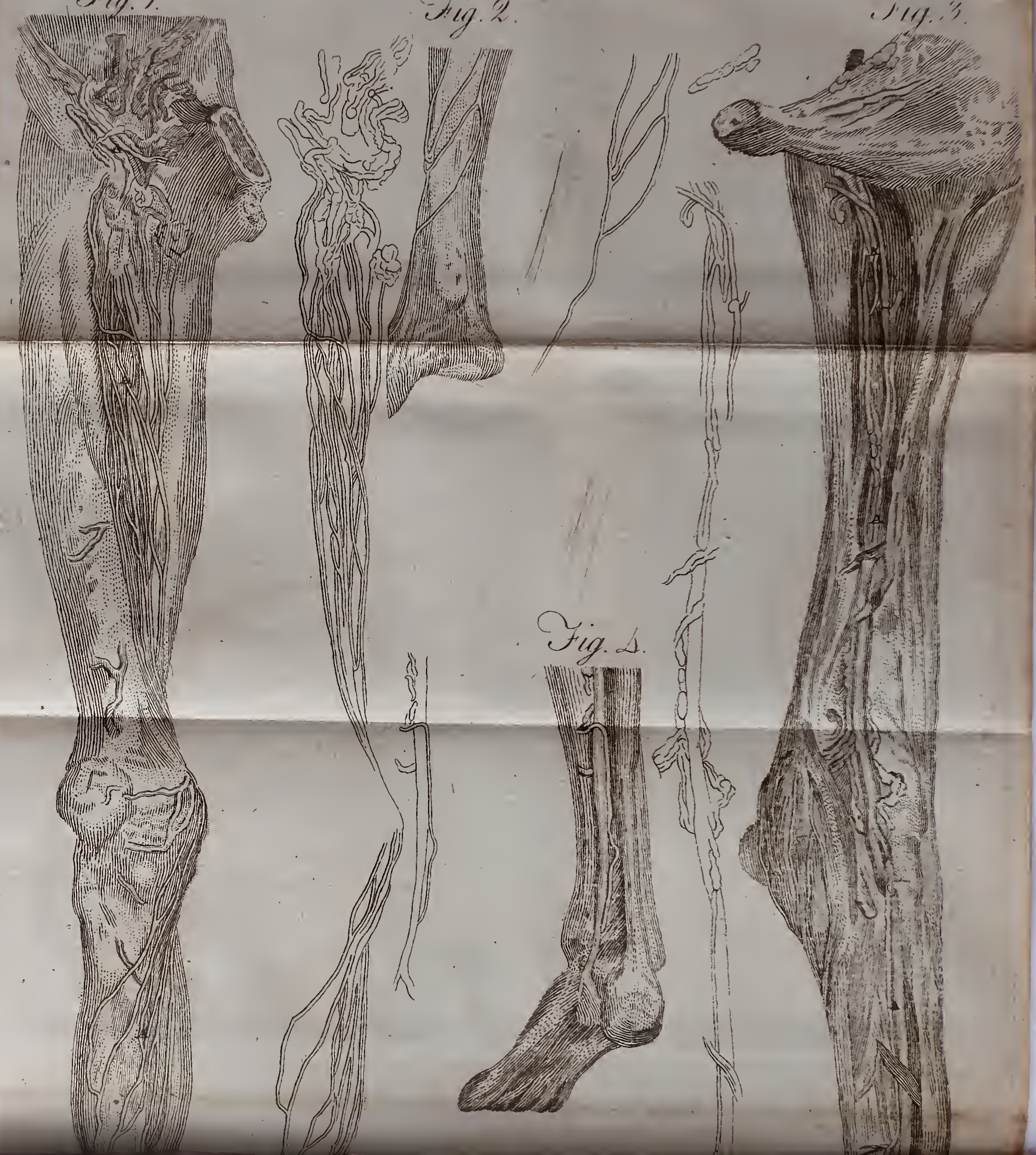


TABLE DD. VIth. of the

FIG. I.

A View of the ſuperficial Lymphatics of the left Thigh and Leg----by HEWSON.

A A A Numerous lymphatics with frequent anaſtomoſes, tending to the inguinal glands.

FIG. II.

A View of the ſuperficial Lymphatics about the Ankle.

FIG. III.

A View of the deep-ſeated Lymphatics of the left Thigh and Leg.

A A A Principal lymphatics going to the groin.

FIG. IV.

A View of the Lymphatics about the Ankle.

Table EE N°I of the Brain

Fig. 1.

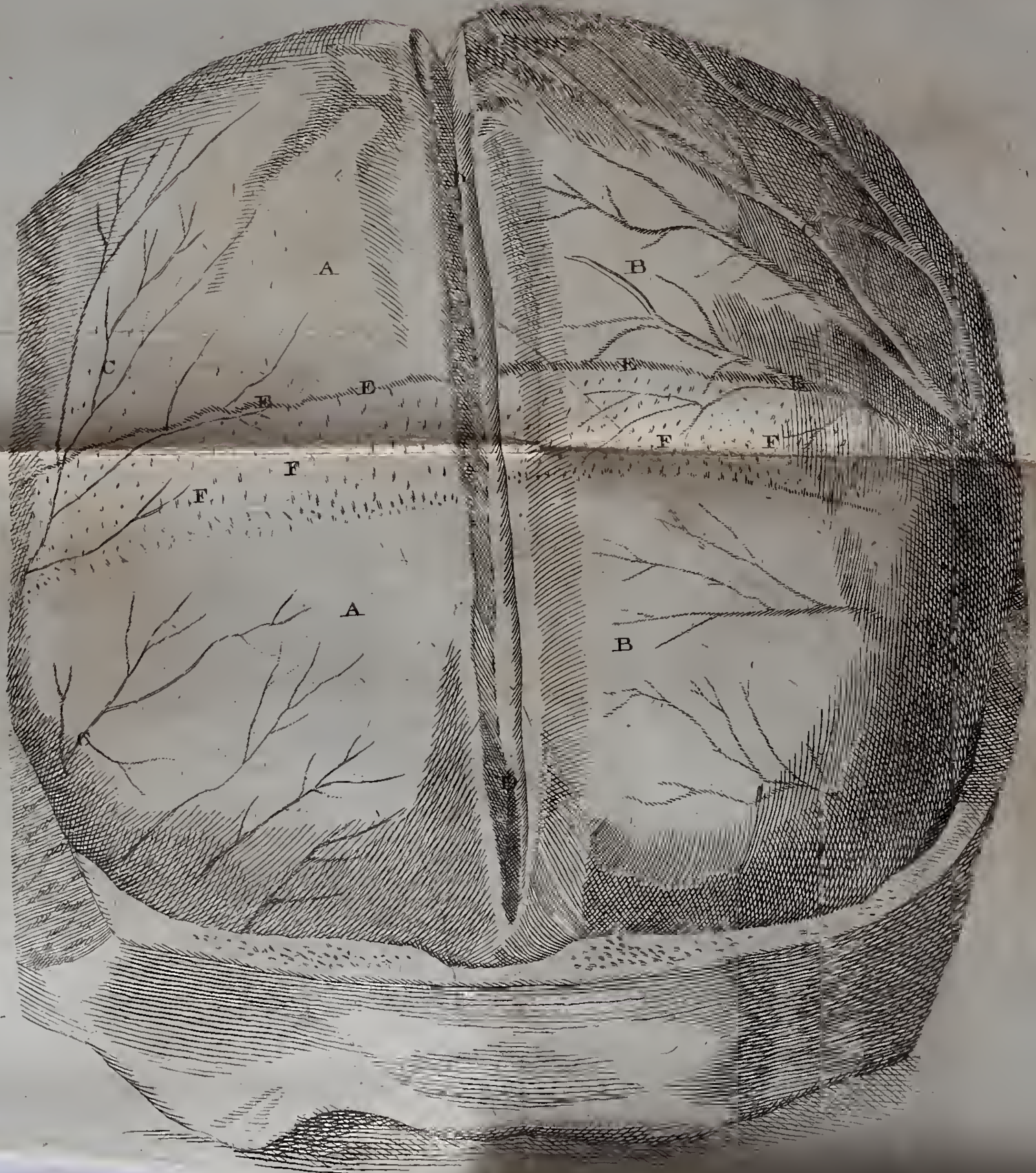


Fig. 2.

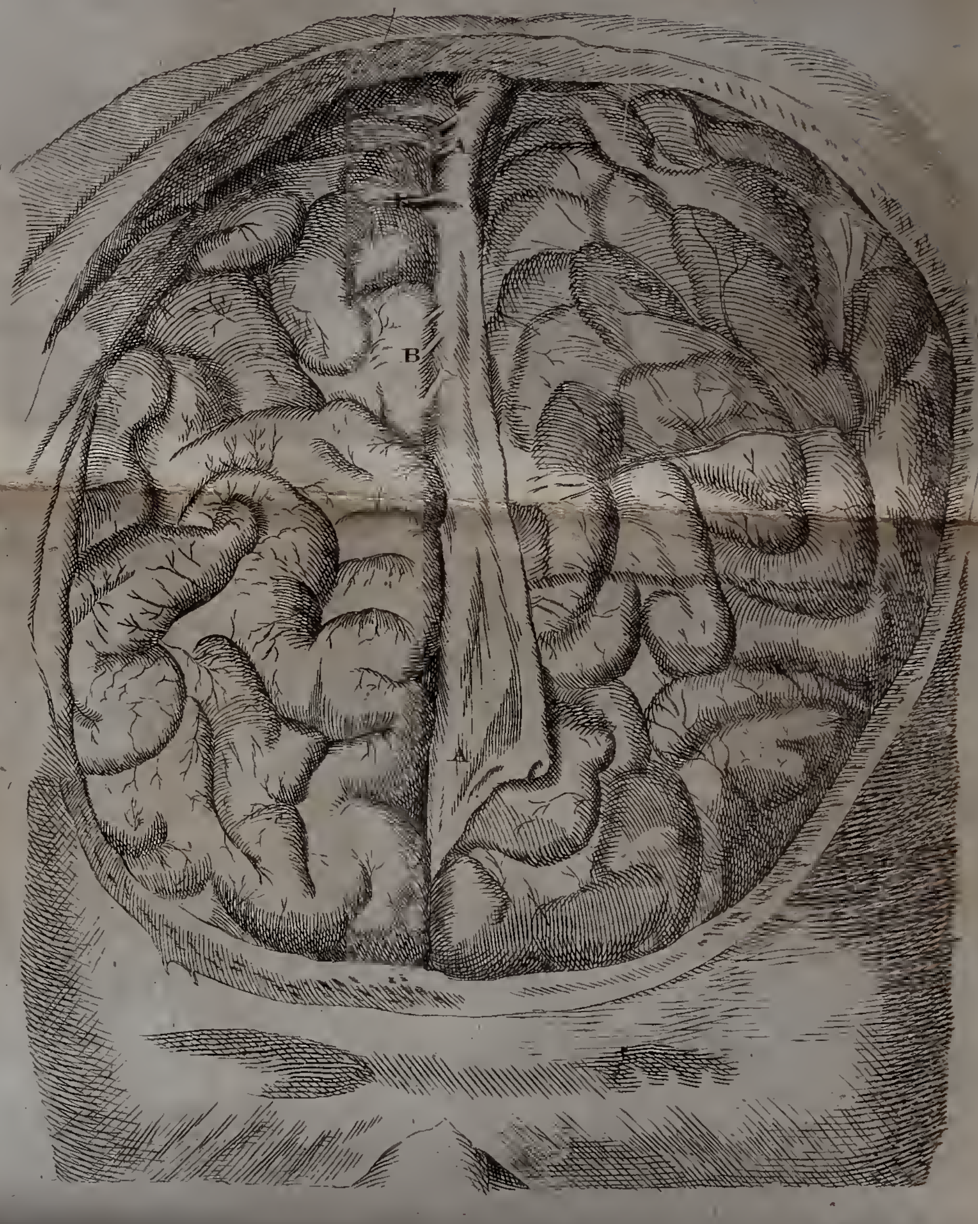


TABLE EE.

FIG. I.

A View of the Dura Mater after the ſuperior Segment of the Skull is ſawn off--------by BIDLOO.

AA That part of the dura mater that covers the right hemiſphere or ſide of the cerebrum.

BB That portion of the dura mater that covers the left hemiſphere.

CCCC The arteries of the dura mater that in general run backwards and upwards, and have correſponding furrows in the ſkull.

DD Superior longitudinal ſinus opened: immediately below which in a vertical plane hangs the falx.

EE, &c. The line that correſponds to the coronal ſuture where the adheſion is greateſt.

FF, &c. The lacerated orifices of veſſels that paſs between the dura mater and ſkull.

FIG. II.

A View of the Pia Mater as it covers the ſuperior part of the Brain, carrying numerous ſmall Blood Veſſels: through it the convolutions of the brain are ſeen.

A A A portion of the dura mater, between the hemiſpheres of the brain, where it forms the ſuperior longitudinal ſinus and falx.

B B Veins tending to the ſuperior longitudinal ſinus, into which they enter obliquely.

Table FF. No. II of the Brain

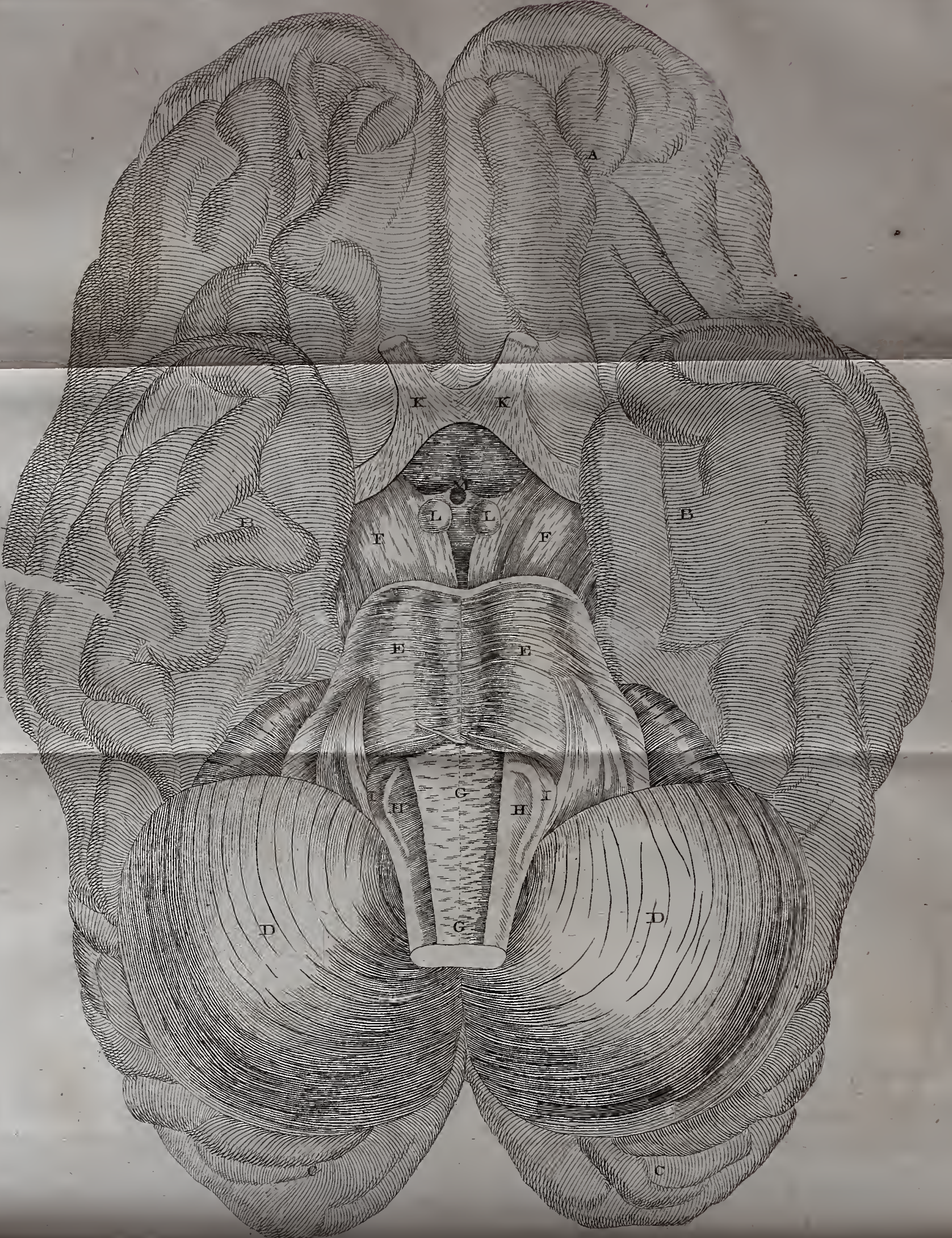


TABLE FF.

A View of the Baſe of the Brain, or Senſorium Commune, freed from its Membranes and Veſſels conſiderably, the better to diſplay its parts----by MONRO.

A A Anterior lobes of the cerebrum.

B B Its middle lobes.

C C Its poſterior lobes.

D D The cerebellum divided into two lobes without convolutions.

E E Tuber annulare, or pons *Varoli*, a part of the medulla oblongata.

F F Anterior crura, or peduncles of the medulla oblongata, derived from the hemiſpheres of the cerebrum.

G G The cauda of the medulla oblongata, cut off where it enters the ſpinal canal and takes the name of ſpinal marrow (medulla ſpinalis). It ought to be regarded as the top or beginning of the ſpinal marrow.

H H Corpora pyramidalia.

I I Corpora olivaria.

K K The optic nerves, diſſected ſo as to ſhew their joining.

L L Tubercula albicantia.

M A part of the infundibulum, extending from the third ventricle, which is immediately above, to the glandula pituitaria in the ſella urcica.

L.E.E.

Tab. [illegible] VII of the Lymphatic System

Fig. 2.

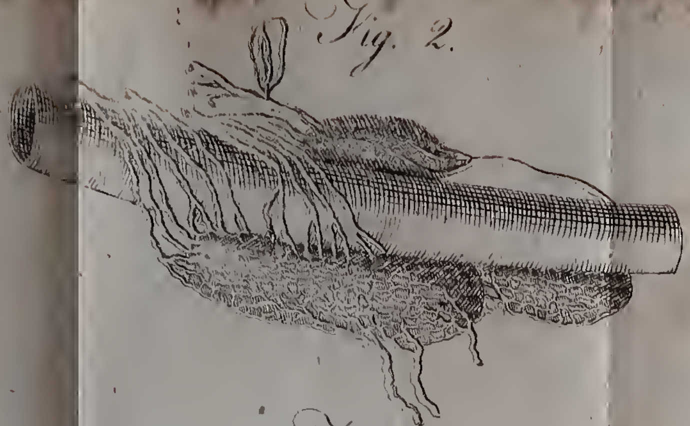


Fig. 1.

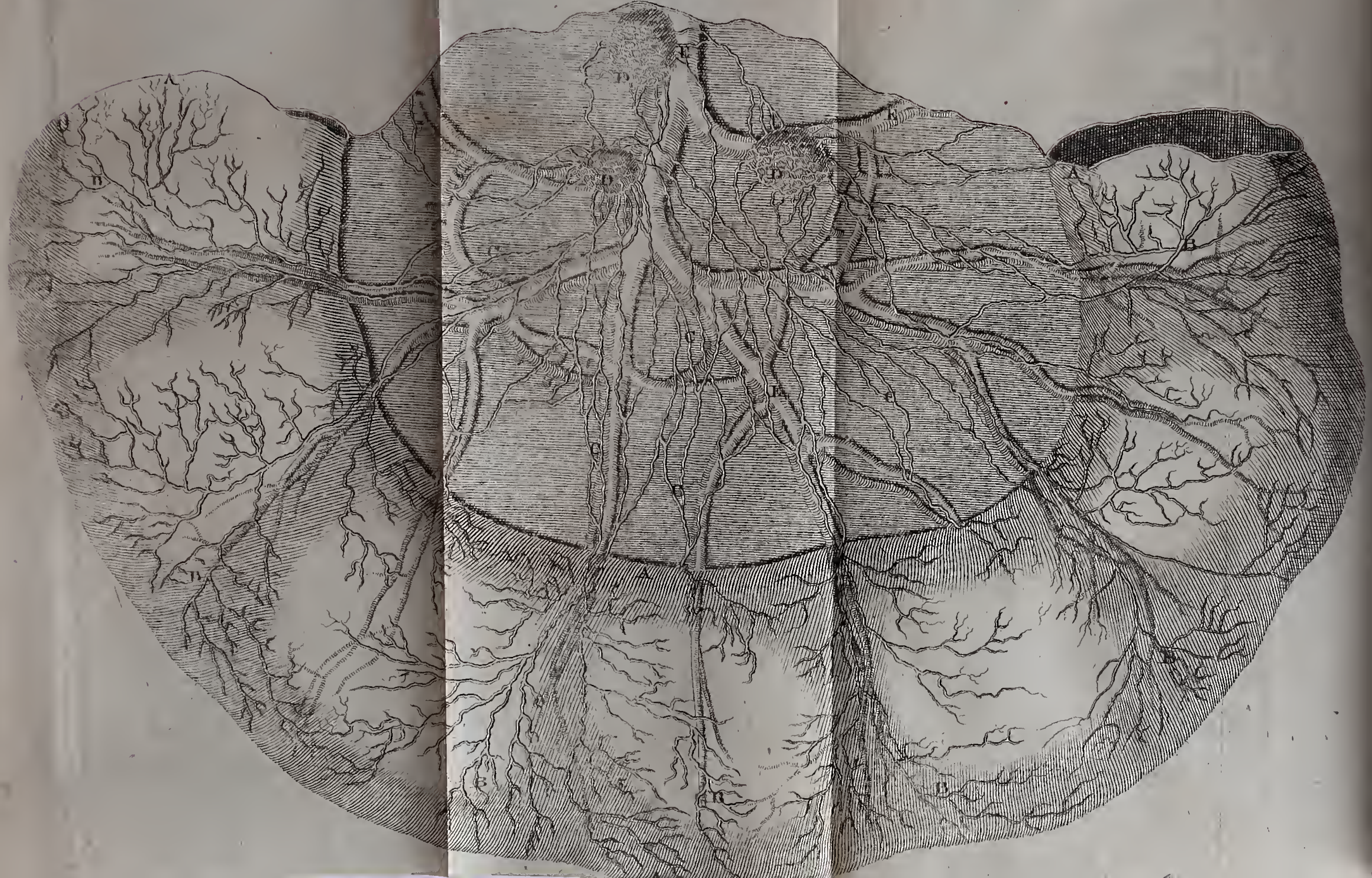


TABLE EEE. VII.th of the Ly

FIG. I.

A View of the Origin and Progreſs of the Lacteals--by MASCAGNI.

AAAA A portion of the ſmall inteſtine.

BBB, &c. The origin of the lacteals from the coats of the inteſtine.

CCC. &c. The trunks of the lacteals variouſly connecting and ſeparating in their way to the meſenteric glands.

DDD Meſenteric glands, ſeemingly cellular, in which the veſſels diſappear.

EEE Meſenteric artery cloſely attended by the correſponding vein, near which the lacteals principally run.

It is proper to remark here, that the ingenious Anatomiſt from whoſe publication this and the following figures are copied, has repreſented the ramifications of the lacteals differently from other celebrated authors; he paints them exactly ſimilar to thoſe of the blood-veſſels; a circumſtance in general not to be obſerved in the lymphatic ſyſtem, and therefore not a little doubtful. Moreover the number is not nearly ſo great as is repreſented in table Y, which is accurately drawn from nature.

FIG. II.

A View of three conglobate Glands, with numerous Lymphatics entering into and going out from them.

E Table VIII of the Lymphatic System

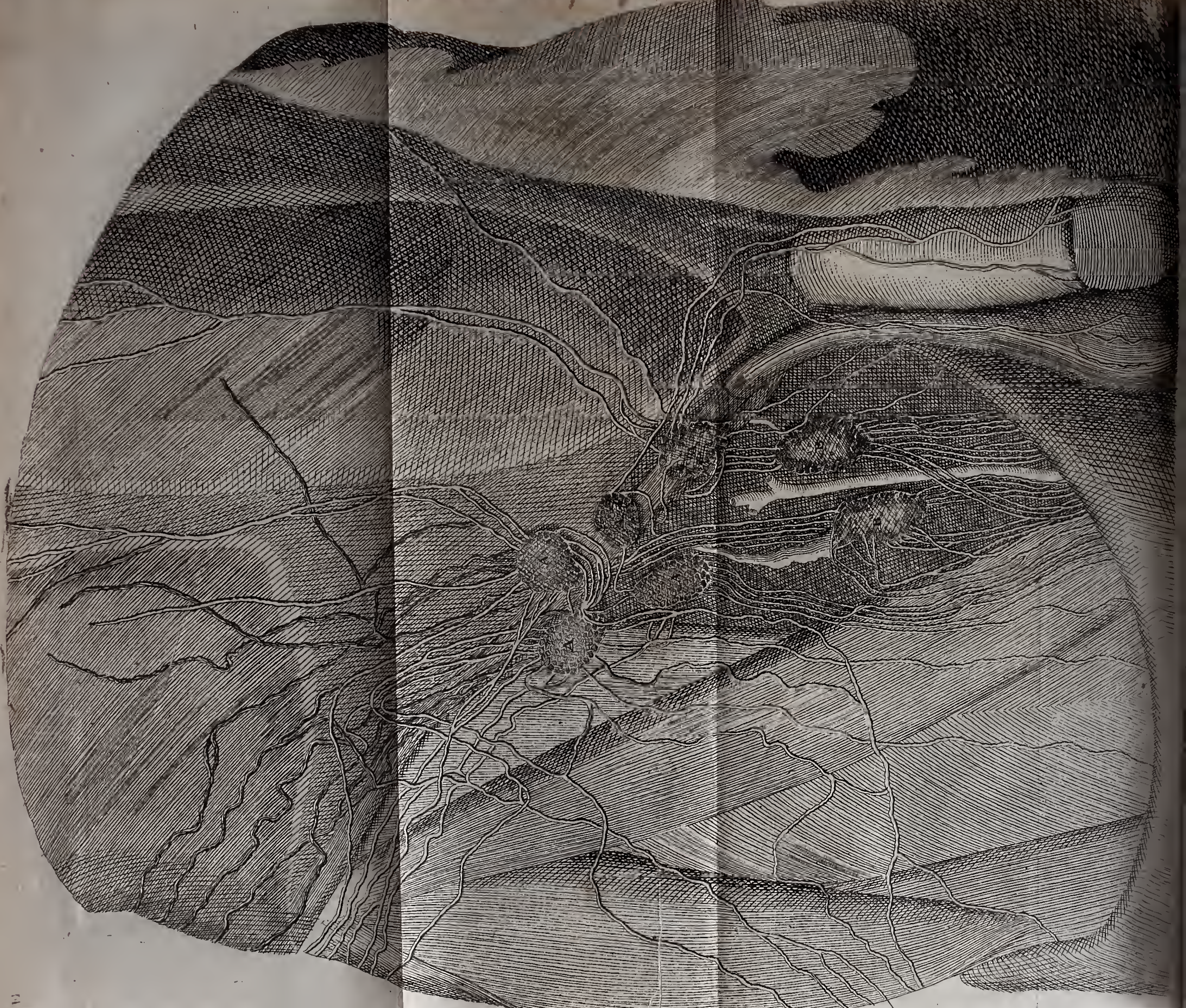


TABLE 4 E. viij of the

A View of the Groin and adjacent parts, deprived of their Integuments, to ſhew the ſuperficial Lymphatics---by MASCAGNI.

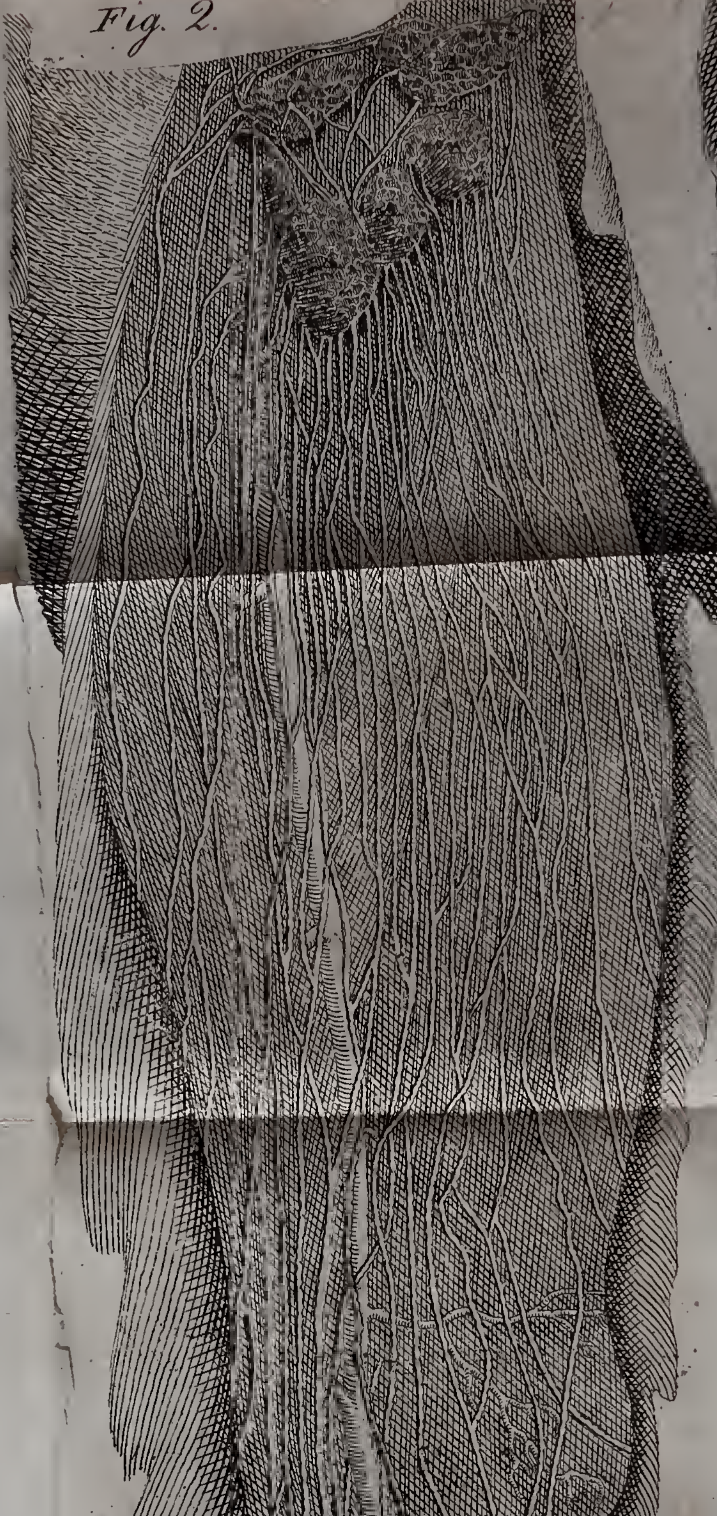
A A A Superior inguinal glands.

B B Inferior inguinal glands, that in ſome meaſure may be called femoral.

To the ſuperior glands the lymphatics tend from the ſcrotum, penis, perinæum, abdomen, and external parts of the thigh; to the inferior ones thoſe from the thigh and leg principally.

Table IX^th of the Lymphatics

Fig. 2.



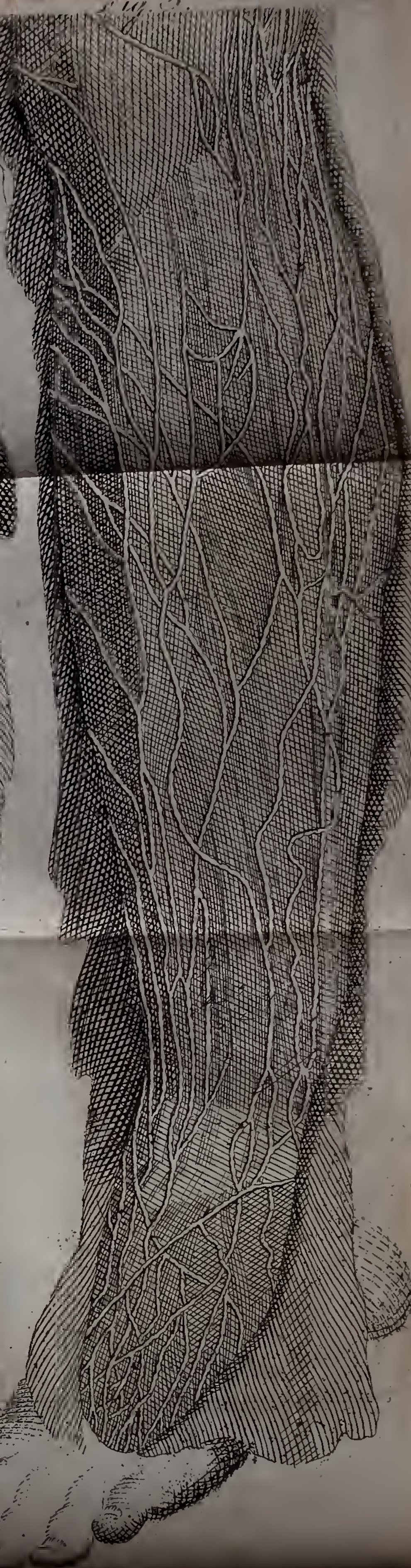


TABLE 5 E. IXth of th

A View of the ſuperficial Lymphatics of the inferior Extremity---by MASCAGNI.

FIG. I.

A View of the Lymphatics on the inſide of the Foot and Leg---by MASCAGNI.

FIG. II.

A View of the Lymphatics on the inſide of the Knee and Thigh; the whole tend upwards, and paſs through the inguinal Glands A A A A---by MASCAGNI.

FIG. III.

A View of the Lymphatics on the outſide of the Foot and Knee---by MASCAGNI.

TABLE

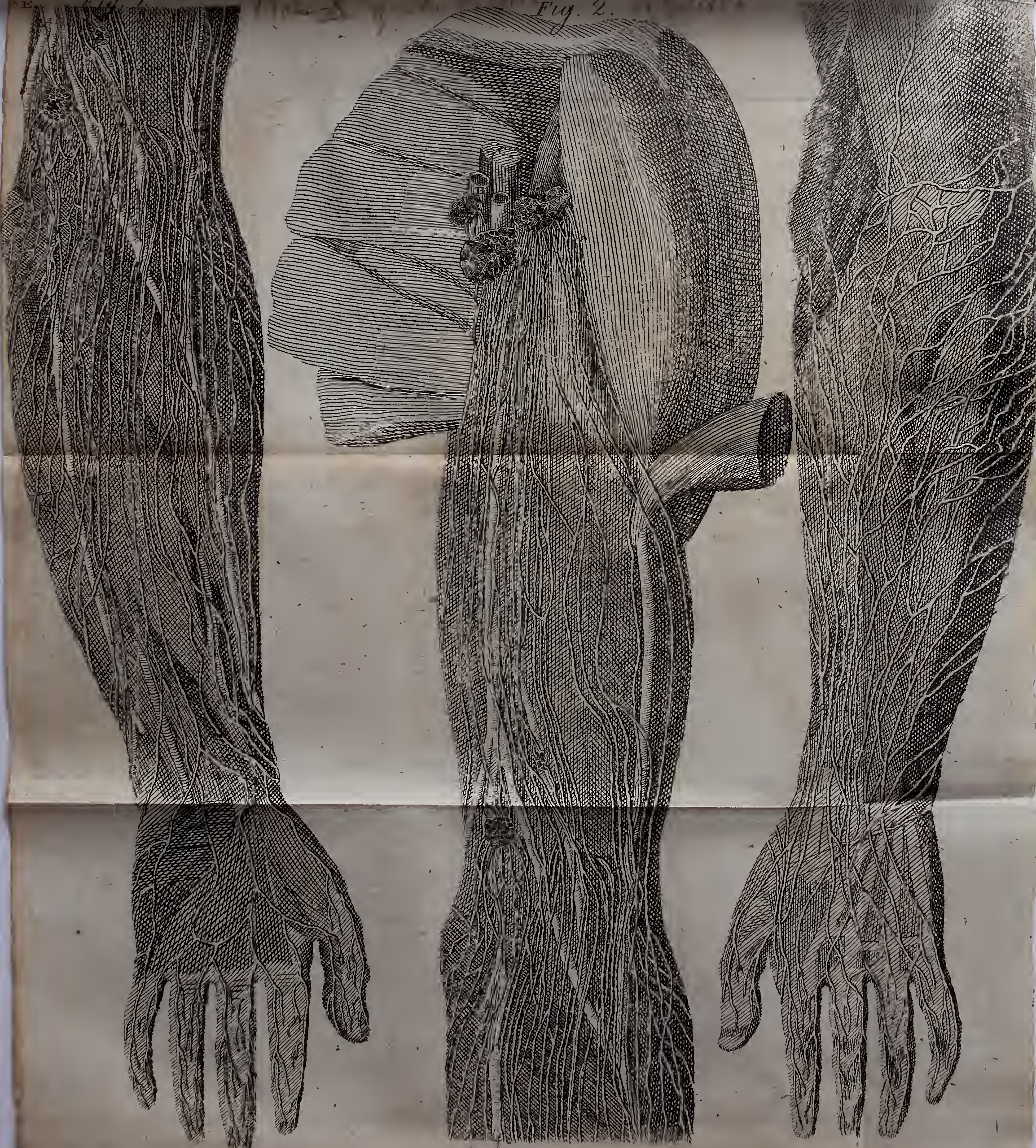


Fig. 1.
Fig. 2.

TABLE 5 E.

Xth of the

FIG. I.

A View of the ſuperficial Lymphatics of the Palm, inſide of the Fore-arm, and Elbow, tending upwards--by MASCAGNI.

A A Two ſmall conglobate glands near the internal condyle of the os humeri.

FIG. 2.

A View of the Lymphatics of the internal Surface of the Fore-arm, proceeding to the Axillary conglobate Glands A A A, through which they paſs to enter the Chords--by MASCAGNI.

B Trunk of the bracheal artery.
C Trunk of the bracheal vein.

FIG. III.

A View of the ſuperficial Lymphatics, on the Back of the Hand and Arm--by MASCAGNI.

Table GG No. iii of the Brain

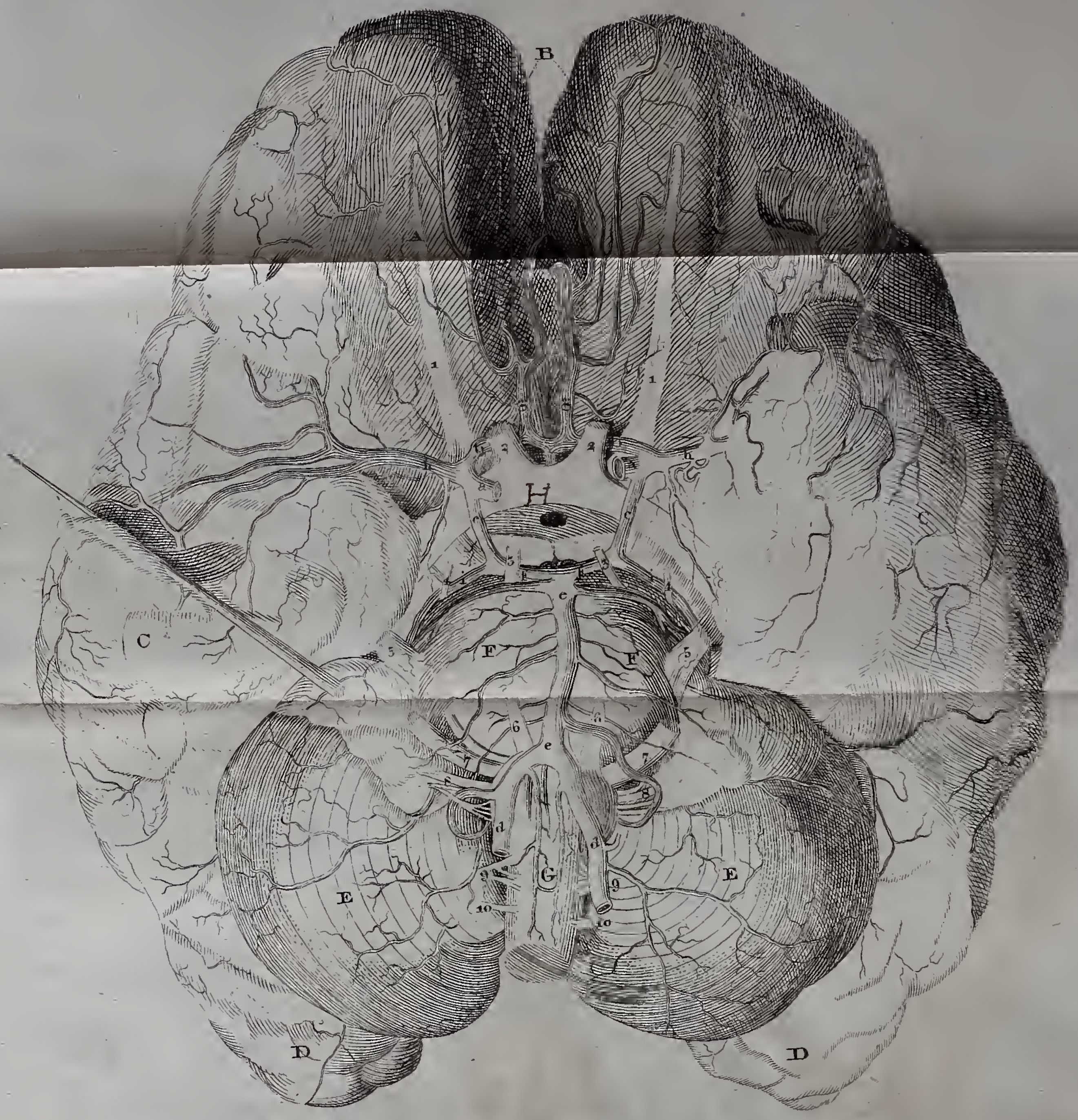


TABLE GG.

A view of the Baſe of the Senſorium Commune, with its Nerves, Arteries, &c.----by HALLER.

A A Anterior lobes of the cerebrum.

B The interſtice between theſe lobes.

C C Middle lobes of the cerebrum.

The exterior lamina of the pia mater is cut, and the right middle lobe kept backwards by a probe, to ſhew the deep diviſion between it and the anterior lobe, named fiſſura SYLVII, containing the middle arteries of the brain.

D D Extremities of the poſterior lobes of the brain, projecting beyond the cerebellum.

E E Lobes of the cerebellum, with their concentric arches.

F F Lateral or lobular portions of the pons VAROLII, or tuber annulare.

G Cauda medullæ oblongatæ, with its protuberances.

H Infundibulum, leading from the third ventricle.

Nerves.

1 1 The proceſſus mamillares, or trunks of the olfactory or firſt pair of nerves, running forward under the anterior lobes of the brain to reach their proper holes in the ethmoid bone.

2 2 The trunks of the ſecond pair, or optic nerves, uniting and then diverging to fall into the optic holes, on their way to the orbits and eye-balls.

3 3 The trunks of the third pair of nerves, or motorii oculorum, ſtretching to the ſuperior obitar fiſſures.

4 4 The trunks of the fourth pair of nerves, or trochleatores, taking the ſame courſe with the former.

5 5 The trunks of the fifth pair, or trigemini.

6 6 The trunks of the ſixth pair, or adducentes.

7 7 The trunks of the ſeventh pair, or auditory nerves (portio mollis & dura) going to the meatus auditorii interni.

8 8 The trunks of the eighth pair of nerves, or par vagum, tending to the holes common to them and the lateral ſinuſſes.

9 9 The trunks of the ninth pair of nerves, or linguales, pointing to their holes in the occipital bone, above the condyles, to reach the tongue.

10 10 The trunks of the tenth pair, that go out under the baſe of the occipital bone by the ſpinal hole.

Arteries.

a a Trunks of the internal carotids as they ariſe by the ſides of the ſella turcica, immediately below the optic nerves.

b b Anterior

b b Anterior anaſtomoſing branches.

c c Poſterior anaſtomoſing branches.

d d Trunks of the vertebral arteries as they enter the ſkull by the occipital hole.

e e Arteria baſilaris, formed by the union of the vertebrals lying in the groove of the tuber annulare, ſending off many lateral branches to the medulla oblongata, cerebellum, &c.

f f Anaſtomoſing branches between the arteria baſilaris and the the poſterior ones of the carotids.

b a c f f c a b Circus arterioſus WILLISII, or arterial circle of WILLIS, formed by the anaſtomoſing branches of the carotids and vertebrals, from the outſide of which the following branches go off:

g g Anterior branches that enter between the anterior lobes, and are diſperſed to both hemiſpheres, reaching to their upper parts;

h h Middle or lateral branches that run along the Sylvian fiſſures to the adjacent parts.

i i Poſterior branches that are diſtributed between the poſterior lobes and the cerebellum.

Table HH N° IV. of the Brain

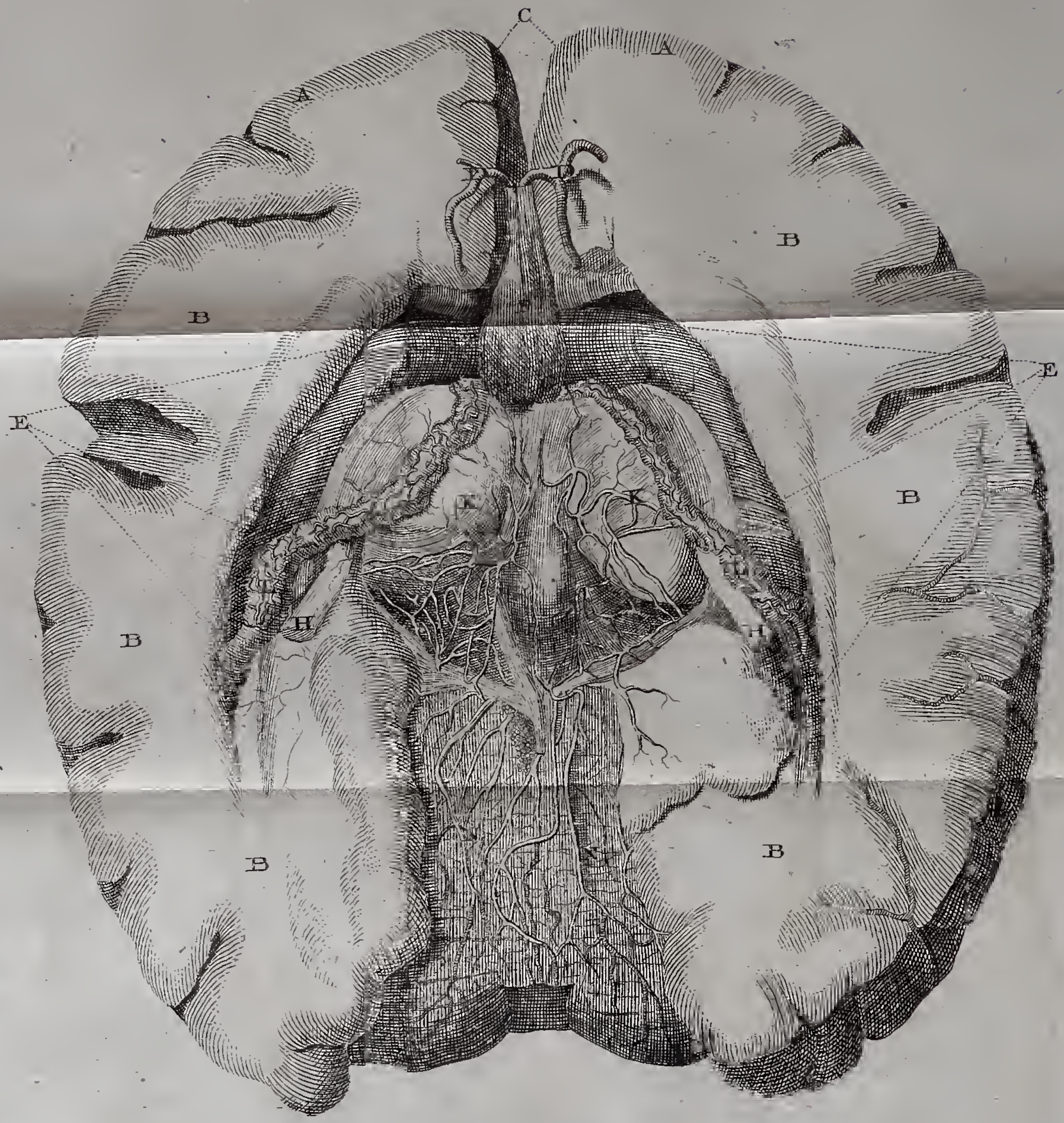


TABLE HH.

A View of a tranſverſe Section of the Brain ----by HALLER.

A A The cortical or cineritious part, every where on the outſide of the

B B, &c. Medullary ſubſtance.

C Diviſion between the anterior lobes.

D D Anterior arteries.

E E Lateral ventricles.

F Fornix turned forward.

G G Anterior pillars } of the fornix.
H H Poſterior pillars } of the fornix.

I I Corpora ſtriata in the anterior part of the ventricles.

K K Thalami of the optic nerves.

L L Plexus choroidæi, which communicate through the opening or hole M.

N N Part of the ſuperior ſurface of the cerebellum covered with the pia mater, carrying many blood veſſels.

Table II No V. of the Brain

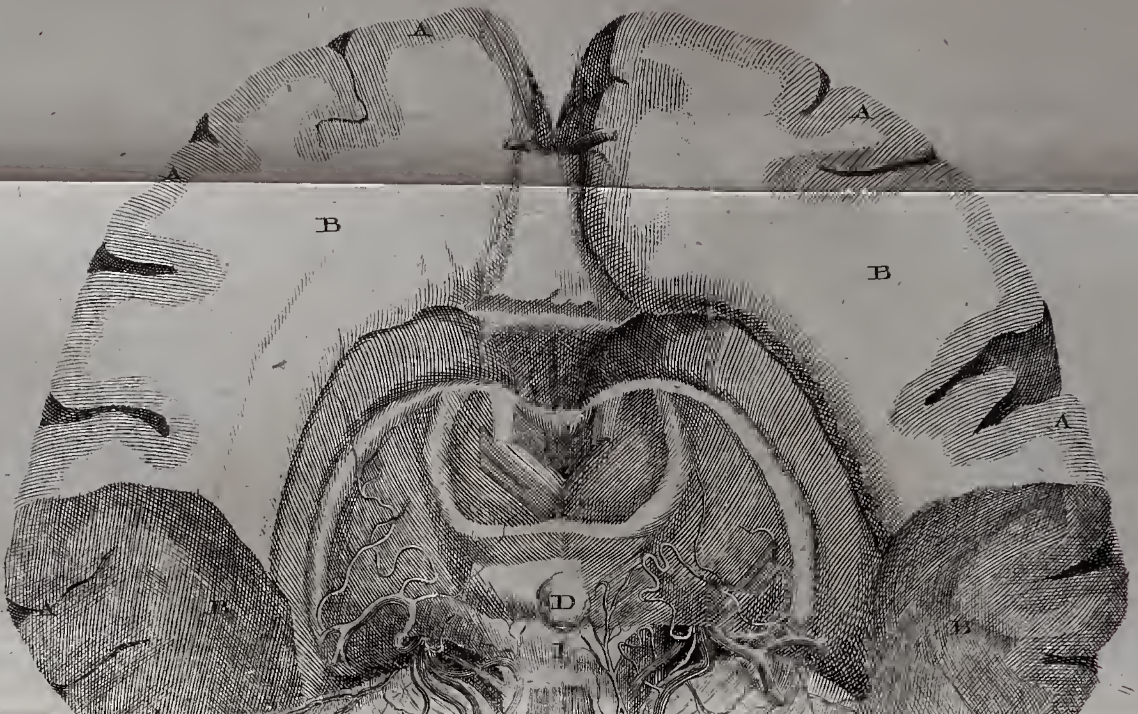


TABLE II.

A View of a tranſverſe Section of the Brain, in a deeper point than the former one---by HALLER.

A A A, &c. The cortical ſubſtance.

B B, &c. The medullary ſubſtance.

C A point correſponding to the third ventricle.

D The pineal gland, lying between the four tubercles, viz. the nates and teſtes.

E E The lobes of the cerebellum, conſiſting of concentric arches, that correſpond to the convolutions of the cerebrum, drawn aſide in conſequence of an inciſion.

F Medullary ſubſtance of the cerebellum that reſembles a tree with foliage, called therefore arbor vitæ.

G G, &c. The cortical part, which is much extended by the foliated diſpoſition of the medullary ſubſtance; a circumſtance that has either been overlooked or ſlightly deſcribed by anatomiſts.

H H The fourth ventricle cut open from above. It communicates with the third one under the pineal gland, by what is called the Iter a tertio ad quartum ventriculum.

I The ſuperior part of the medulla oblongata, which, like an iſthmus, connects the cerebrum and cerebellum.

K k

Table VI K N.º VI) of the Brain

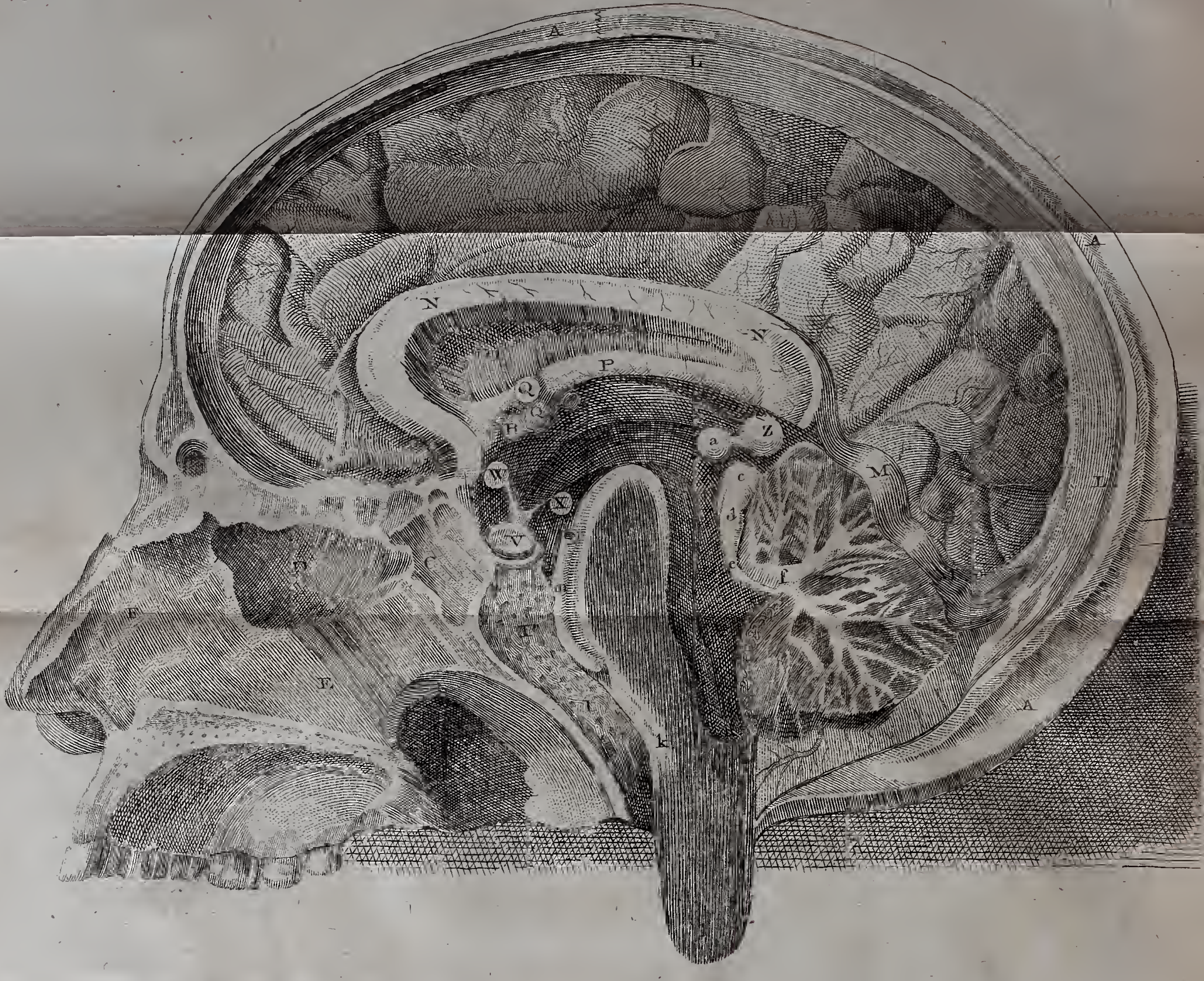


TABLE KK.

A View of a perpendicular Section of the Head----by MONRO.

A A The cranium.

B Part of the frontal ſinus.

C Part of the left ſphenoidal ſinus.

D The naſal lamella of the ethmoidal bone.

E The vomer.

F The cartilaginous part of the ſeptum.

G The opening from the right noſtril into the throat.

H The palatal proceſs of the right maxillary bone, with the alveolary one carrying the teeth.

I I The cancellated portion of the cuneiform proceſs of the occipital bone, and body of the ſphenoidal one very abundant.

L L L The root of the falx, the reſt being removed to ſhew the convolutions on the inner ſide of the right hemiſphere of the brain.

M M Part of the tentorium cerebello ſuper extenſum, carrying the ſinus named torcular HEROPHILI.

N N The corpus calloſum.

O The ſeptum lucidum.

P The body of the fornix.

Q Q The two anterior crura of the fornix.

R Commiſſura cerebri anterior.

S The paſſage by which the lateral ventricles of the brain communicate with each other, and with the third ventricle.

T Right ſurface of the third ventricle.

U Infundibulum, beginning from the third ventricle.

V The glandula pituitaria in the ſella turcica.

W Left optic nerve.

X Left tuberculum albicans, behind the infundibulum.

Y Part of the choroid plexus.

Z The pineal gland, with two peduncles, one connecting it with the ſide of the third ventricle, and the other to the commiſſura cerebri poſterior a.

b The iter ad quârtum ventriculum.

c d Left natis and teſtis.

e The valvula *Vieuſſenii*.

f The arbor vitæ cerebelli.

g The cavity of the fourth ventricle.

h The cavity of the fourth ventricle, ſhut by the choroid plexus and pia mater.

i Tuber annulare.

k The cauda of the medulla oblongata.

l Upper part or beginning of the ſpinal marrow.

m Arteria baſilaris.

Table VII. of the Brain

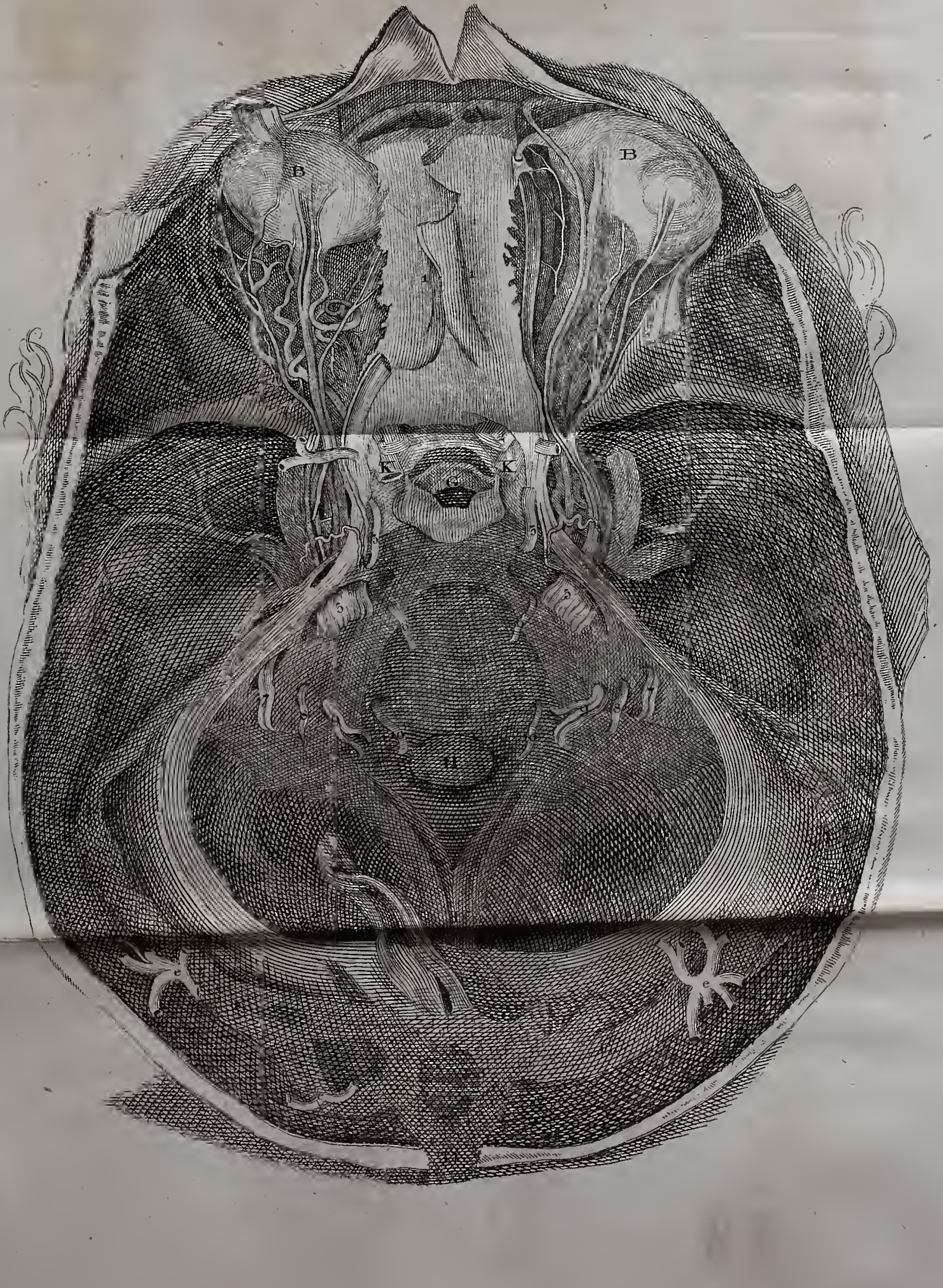


TABLE LL.

A View of the internal Surface of the Baſe of the recent Skull, covered by the Dura Mater; containing Sinuſſes, Nerves, &c.---by HALLER.

A A The frontal ſinuſſes.

B B The eye-balls; the upper part of the orbits being removed.

C A part of the tentorium cerebelli, containing the torcular HEROPHILI ending in the lateral ſinuſſes.

D Loweſt part of the ſuperior longitudinal ſinus, ending in the lateral ones by a bifurcation.

E E Lateral ſinuſſes receiving veins e e e, in their courſe.

F F Cavernous ſinuſſes cut open.

G Sella turcica, containing the glandula pituitaria.

H Top of the ſpinal marrow appearing through the occipital hole.

I Falx cerebelli, adhering to the inferior part of the vertical ſpine of the occipital bone.

K K Trunks of the carotids as they ariſe by the ſides of the ſella turcica, immediately behind the optic nerves.

L L Arteries of the dura mater derived from the external carotids.

Nerves.

1 1 Filaments of the firſt or olfactory pair, paſſing downwards in the holes of the cribriform lamella of the ethmoidal bone to be ſpread in the noſe.

2 2 Trunks of the ſecond pair or optic, entering their proper holes to reach the bottom of the orbits in their way to the poſterior ſurface of the eye-balls.

3 3 Trunks of the third pair, or motorii oculorum, running through the cavernous ſinuſſes, principally to muſcles of the eye-balls.

4 4 Trunks of the fourth pair. very ſmall, paſſing through the cavernous ſinuſſes to the trochleares muſcles chiefly.

5 5 Trunks of the fifth pair, large, paſſing into the cavernous ſinuſſes, in which each is divided into three branches, hence named trigimini, which go to the orbit, the upper and under jaws, reſpectively through their proper holes.

6 6 Trunks of the ſixth pair, entering the dura mater, behind the ſella turcica, to reach the cavernous ſinuſſes and orbits.

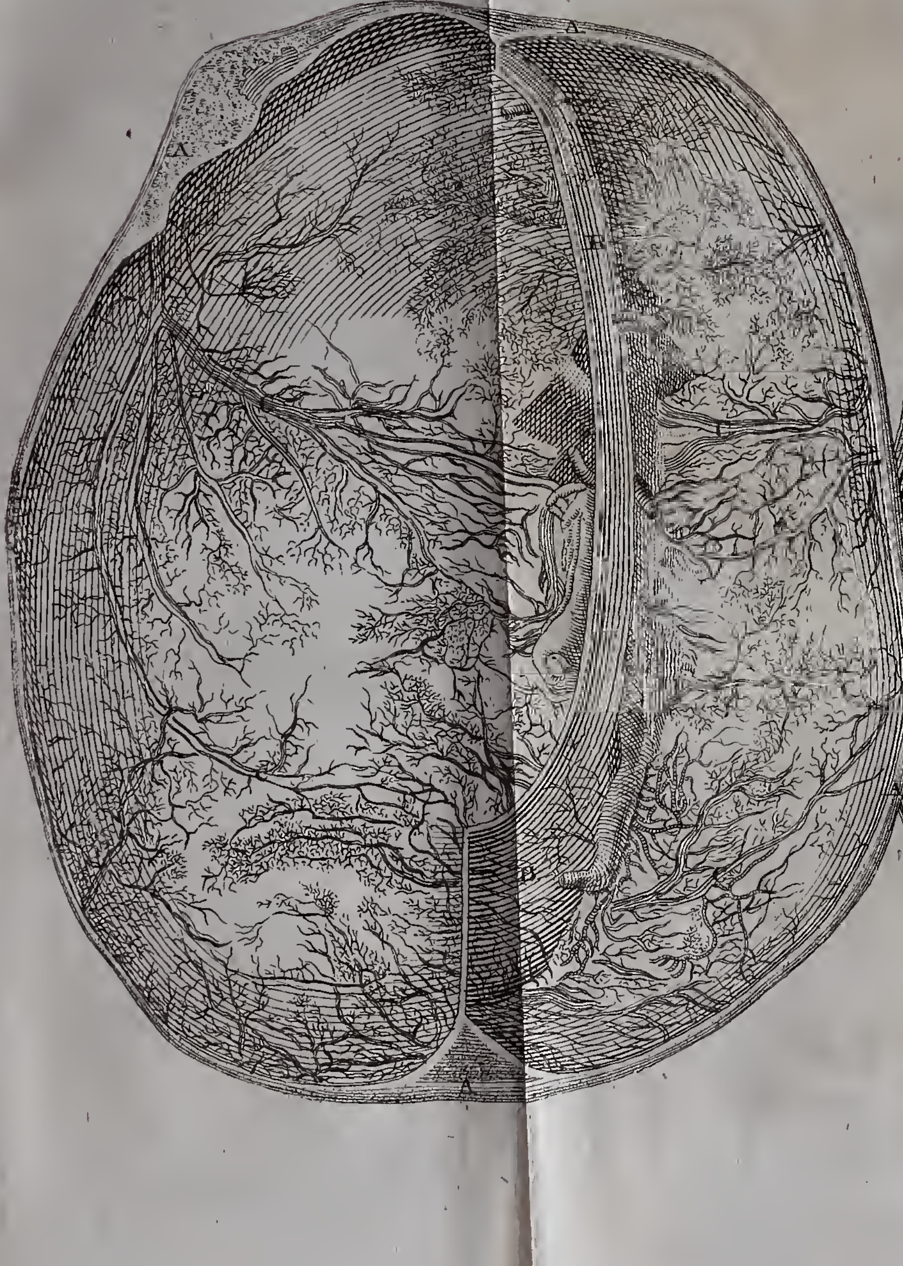
7 7 Trunks of the ſeventh pair, or auditory nerves, entering the meatus auditorii interni; each is double, conſiſting of portio mollis and dura.

9 9 Trunks of the ninth pair, or hypogloſſal nerves.

10 10 Trunks of the tenth pair.

No. viij. Of the Brain.

Fig. 1



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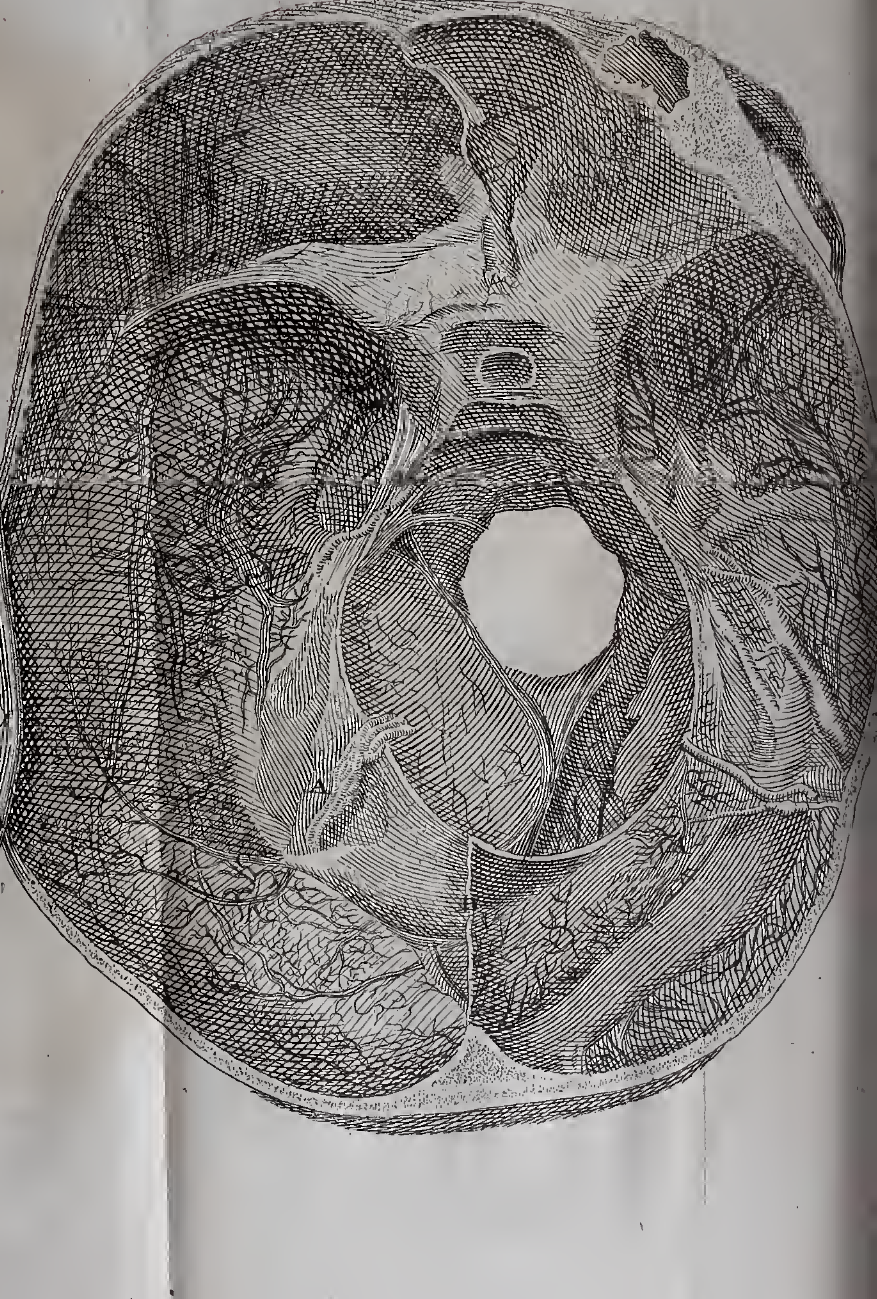


TABLE LLL.

A View of the Veins of the Dura Mater, in ſitu--by Dr. WALTER, ſen.

FIG. I.

Repreſents the upper Segment of the Dura Mater adhering to the correſponding Segment of the Skull.

AAAA The edge of the ſkull.

BB The falx of the dura mater.

CCCC The veins of the dura mater, ſome of them running to the ſuperior longitudinal ſinus, and others to the baſe of the ſkull.

FIG. II.

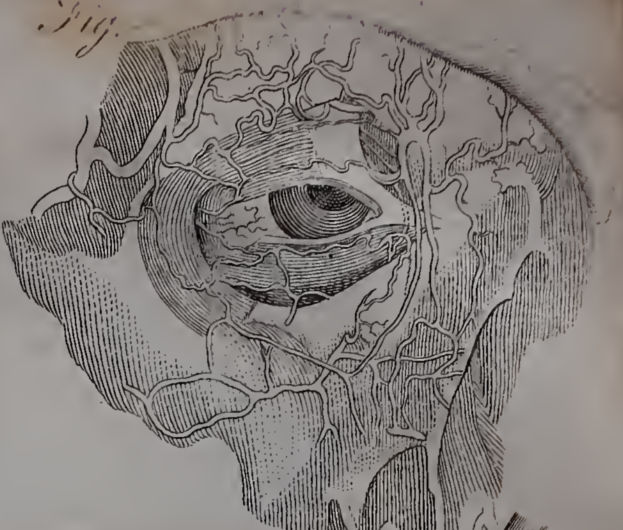
Repreſents the Baſe of the Skull with its Dura Mater in Situ.

AA Tentorium cerebelli, or ſeptum duræ matris.

B The line from which the poſterior extremity of the falx is cut.

CCCC The veins paſſing to the principal ſinuſſes of the dura mater; many of which are likewiſe called ſinuſſes.

Fig.



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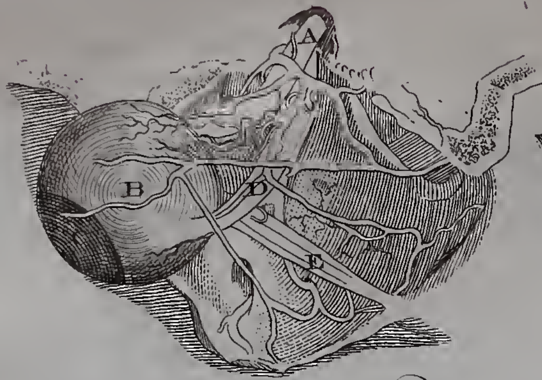

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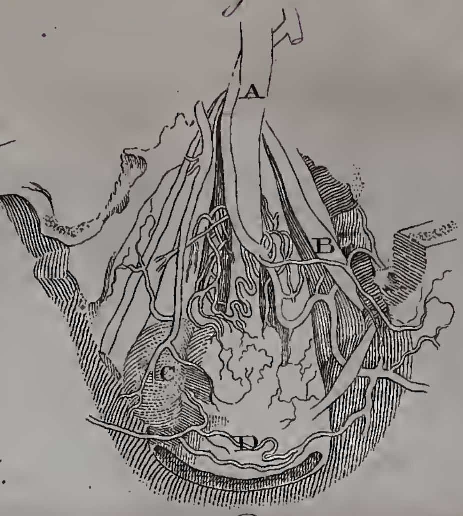

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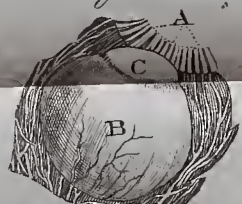

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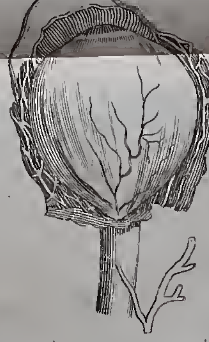

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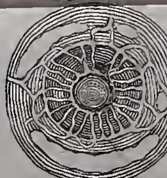

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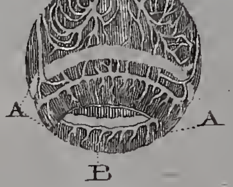

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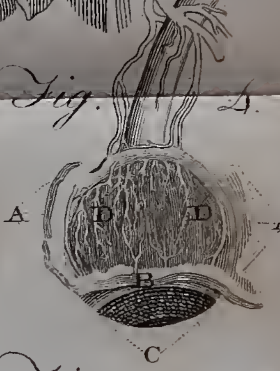

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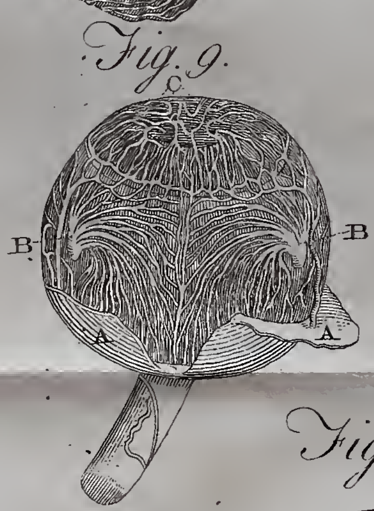

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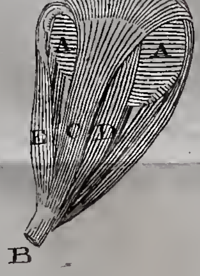

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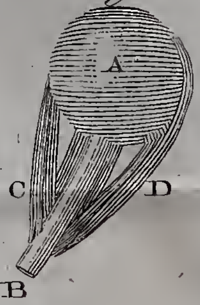

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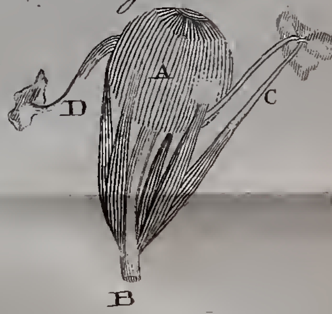
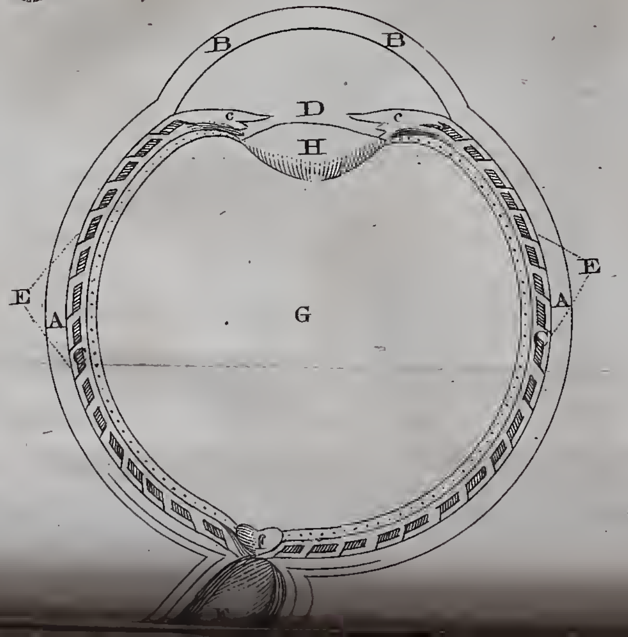


Fig. 13.



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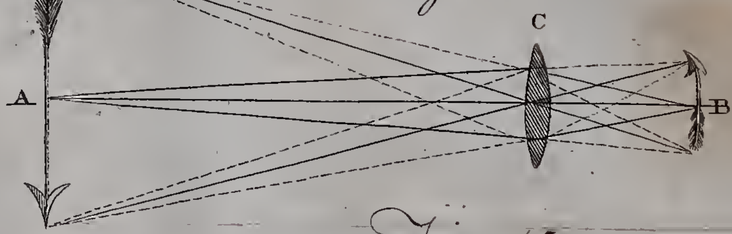


Fig. 15.

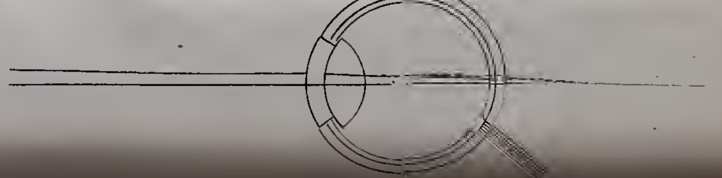


TABLE MM.

Views of the Eye-ball, its Veſſels, Muſcles, &c. ---by HALLER, ALBINUS, and others.

FIG. I.

A View of the external Veſſels of the Eye; to obtain which the Integuments and a conſiderable ſhare of the Orbicularis Muſcle are removed.

The principal branches are derived from the angular veſſels, while a general anaſtomoſis takes place with thoſe of the forehead, temple, and cheek, and the opening of the lids is ſurrounded with a kind of circle, like that of the mouth.

FIG. II.

A View of the upper ſide of the Eye-ball and its parts, obtained by removing the ſuperior Segment of the Orbit, the Levator Palpebræ, and Rectus ſuperior Muſcles.

A Optic nerve, ſomewhat curved.
B Muſculus trochlearis.
C Lachrymal gland.
D Tarſus ſuperior.

Fig. III.

A View of the inferior Veſſels of the Eye-ball; to obtain this it is drawn very much aſide.

A The optic nerve.

B The opaque cornea, or ſclerotic coat of the eye-ball, freed from muſcles, &c.

C The lucid cornea, or ſclerotis.

D The rectus inferior muſcle.

E The obliquus minor muſcle.

Fig. IV.

A View of the Eye-ball, after the outer Coat or Sclerotis is partly detached and turned off.

A A The opaque ſclerotis, partly detached by diſſection.

B B Poſterior and anterior portions, entire.

C Lucid cornea, and part of the pupil appearing through it.

D D The choroid coat, with numerous veſſels beautifully anaſtomoſing on its ſurface.

Fig. V.

A View of the Eye-ball, entirely deprived of the opaque and livid Cornea, and conſequently of the exterior Surface of the choroid Coat, Uvea, and Pupil, with their Veſſels.

A A Ciliary circle or ligament (orbiculus ciliaris, or ligamentum ciliare) to which the anterior part of the opaque cornea ſlightly adheres.

B The uvea, or iris, or that part of the choroid coat ſituated before the ciliary ligament, containing the circular hole called the pupil.

C C Vaſa vorticoſa, ſo named from the manner of their diſperſion.

FIG. VI.

A front View of the Eye-ball, from which the lucid Cornea is removed, to ſhew the Iris, the Pupil, and the diſpoſition of the Veſſels.

FIG. VII.

A ſide View of the Eye-ball, from the ſclerotic and choroid Coats are partly removed or turned off, to ſhew the Retina and the diſperſion of the central Artery on it.

FIG. VIII.

A View of the Eye-ball, nearly the ſame as in Figure 7.

A Ciliary proceſſes on the ſuperior ſurface of the uvea, near the root.

B Retina, with its veſſels including the vitreous humour and its capſule.

C The cryſtalline humour or lens covered with its capſule.

FIG. IX.

A View of the Eye-ball magnified, from which the opaque and lucid Corneæ have been removed, to ſhew the choroid Coat, Uvea, and Pupil with the beautiful diſtribution of the Blood-veſſels----by MEYERS.

A A Part of the opaque ſclerotis.

B B Vaſa vorticoſa on the exterior ſurface of the choroid coat, anaſtomoſing with one another, and with thoſe of the uvea, the laſt of which are continued over

C The pupil, to ſhew their diſtribution on the membrana pupillaris of the fœtus, which fills up the pupil.

FIG. X.

A View of the Eye-ball and its Muſcles----by ALBINUS.

A A The eye-ball.

B The optic nerve.

C Levator palpebræ ſuperioris.

D Rectus ſuperior.

E Trochlearis, within which a little of the rectus internus is ſeen.

Fig. XI.

A View of the Eye-ball deprived of ſome of its Muſcles.

A The eye-ball.
B The optic nerve.
C Rectus internus.
D Rectus externus.

The rectus inferior ſomewhat appears below the optic nerve.

Fig. XII.

A View of the Eye-ball and all its Muſcles.

A The eye-ball.
B The optic nerve.
C The trochlearis, with its tendon tranſmitted through the trochlea.
D Obliquus minor.

Fig. XIII.

A View of an horizontal Section of the Eye-ball, to ſhew the Diſpoſition of the Coats and Humours----by Le Cat.

A A Opaque cornea.
B B Lucid cornea.
C C Choroid coat.
c c Uvea.
D Pupilla.
E E Retina.

F Trunk of the optic nerve with its coats, of which thoſe of the eye-ball are repreſented as continuous.

f Inſenſible point from which the retina is expanded.

G Vitreous humour contained in its capſule.

H Cryſtalline humour or lens, contained in its capſule, between the anterior ſurface of which, and the poſterior one of the uvea, is a ſpace called poſterior chamber of the aqueous humour; and the ſpace before the iris is anterior chamber of the ſame humour; becauſe this humour poſſeſſes both.

FIG. XIV.

Shews how the image of an object, A, is inverted, B, by the rays being refracted by the lens, C, and conſequently the diſpoſition of the picture of an object on the retina.

FIG. XV.

Shews how a pencil of rays is refracted by the humours of the eye, ſo as to have its focus fall on the retina.

TABLE NN.

A View of the cutaneous Veſſels, &c. of the left ſuperior Extremity, from which the Integuments have been removed----by CAMPER.

FIG. I.

Muſcles.

A Pectoralis major.
B Deltoides.
C Latiſſimus dorſi.
D Biceps flexor cubiti.

d d Round tendon of the biceps, with its aponeuroſis extended to the inſide of the fore-arm, concealing all the parts except the ſuperficial veins.

E Triceps extenſor cubiti.
F Pronator teres.
G Supinator radii longus.

Artery and Veins.

a Brachial artery, appearing near the inner edge of the tendon of the biceps, where it may always be felt.

b Baſilic vein, near the internal condyle.
c Cephalic vein, near the external condyle.
d Median vein, near the middle of the arm.
e Median baſilic vein.
f Median cephalic vein.

g Deep-ſeated vein, accompanying the artery, and cloſely attached to it.

Nerves.

1 Axillary branch from the brachial plexus.
2 2 2 Cutaneous nerve.
3 3 3 Muſculo-cutaneous nerve.

FIG. II.

Muſcles.

A Tendon of the flexor pollicis longus; paſſing through the flexor pollicis brevis.

B Adductor pollicis.

C Abductor indicis.

D D D D Muſculi lumbricales, lying in the interſtices of the flexor tendons.

E E E E Tendons of the extenſor digitorum ſublimis, or perforatus.

F F F Tendons of the extenſor digitorum profundus, or perforans, appearing through the ſlits of the perforatus.

G G G The mucous ſheaths, containing the aforeſaid tendons in the grooves of the finger bones.

Veins.

a a a Branches forming the median vein.
b Branches forming the baſilic vein.

Nerves.

1 Ulnar nerve, which, after paſſing behind the annular ligament and palmar aponeuroſis, is diſtributed to the little and ring fingers.

2 Radial nerve, that in the palm is divided into branches that go to the ring, middle, fore fingers, and thumb.

TABLE OO.

A View of the left ſuperior Extremity, in a farther Progreſs of Diſſection----by CAMPER.

FIG. I.

Muſcles.

A Pectoralis minor.
B Coraco-brachialis.
C Biceps, drawn a little aſide, and the aponeuroſis cut from its inferior tendon.
D Brachialis internus.
E Triceps extenſor cubiti.

Arteries and Vein.

a a Trunk of the axillary.
b b b Trunk of the humeral artery, ſending off the arteriæ reflexæ, or reflected branches.
c Point of diviſion of the brachial artery, behind the aponeuroſis of the biceps, and on the inſide of the tendon.
d Radial, &c.
e Ulnar branches.
f Trunk of the axillary vein, lying lower and more ſuperficial than the artery.
g Cut trunks of the ſuperficial veins.
h h Cut trunks of the deep-ſeated veins that accompany the artery.
i i Arteries and veins of the axillary glands.

Nerves.

1 Part of the axillary or brachial plexus, from which the brachial nerves are derived.

2 Nervus ſcapularis.

3 Nervus articularis.

4 4 Nervus muſculo-cutaneus, or perforans CASSERII.

5 5 Nervus muſcularis.

6 6 Nervus radialis, which, near the flexure of the elbow, lies on the inſide of the artery, and is alſo covered by the bicipital aponeuroſis.

7 7 Nervus ulnaris, that paſſes behind the internal condyle of the os humeri to reach the fore-arm and hand.

FIG. II.

Muſcles.

A Flexor carpi ulnaris.

B Palmaris longus.

C Flexor carpi radialis.

D Supinator radii longus.

E Palmaris brevis.

F Opponens pollicis.

G Flexor pollicis brevis.

H Ligamentum carpi annulare anterius.

Arteries.

a a Ulnar artery.

b b Radial artery.

c c c Palmar arterial arch, formed by the radial and ulnar arteries.

d d d d d Branches ariſing from the palmar arch, running to the ſide of the little finger, and to the interſtices of the others. The three middlemoſt, at the beginnings of the fingers, are each divided into two, and accompany the nerves along the ſides of the ſheaths of the tendons.

Nerves.

1 1 1 Ulnar nerve.

2 2 2 Radial nerve.

TABLE PP.

FIG. I.

A View of a Diſſection of the left Side of the Neck and correſponding Arm--by CAMPER.

Muſcles.

A A Scalenus anticus.
B B Scalenus medius.
C Scalenus poſticus.
D D Subſcapularis.
E Teres minor.
F Teres major.
G Long tendon of the biceps, paſſing through the capſular cavity.
H Short tendon of the biceps, going to the coracoid proceſs.
I Coraco-brachialis.
K K K Intercoſtales.

Nerves.

a a a a Portion of the left intercoſtal nerve.
b b b, &c. Axillary or brachial plexus, that ſends branches to the arm.
c Scapularis.
d Perforans CASSERII.
e Muſcularis.

FIG. II.

A View of a Diſſection of the Back of the Fore-arm and Hand.

A Tendons of the extenſor communis digitorum.

B Ligamentum carpi annulare poſterius.

C D E Extenſors of the thumb.

F Extenſor carpi ulnaris.

G G Extenſores carpi radiales longior & brevior.

H Abductor indicis.

I Adductor pollicis.

K K Interoſſei appearing in the interſtices of the extenſor tendons.

Nerves.

a Branch of the muſcularis.

b Branch of the ulnaris.

Fig. 2.

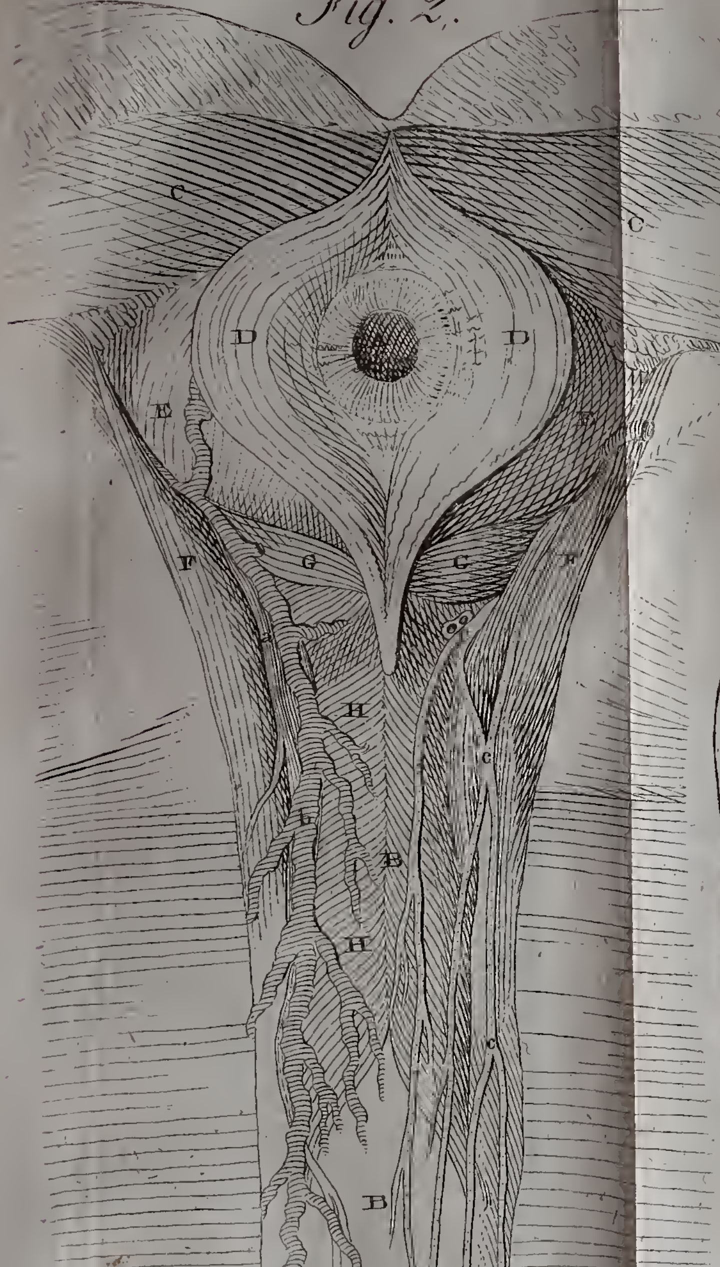


Fig.

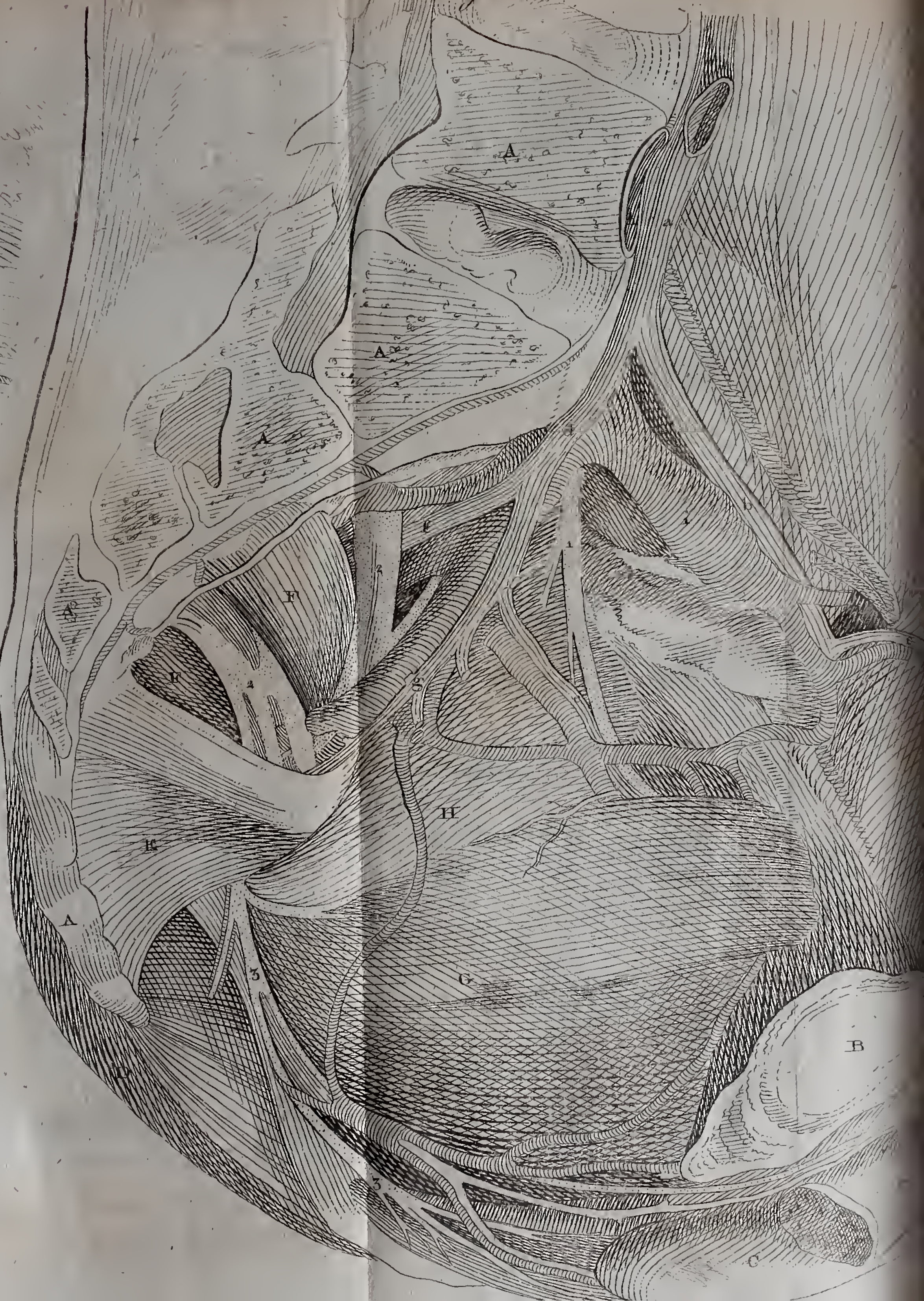


TABLE QQ.

FIG. I.

A View of a Section of the Pelvis---by CAMPER.

A A, &c. Laſt lumbar vertebra, os ſacrum, and os coccygis, cut vertically.

B Left os pubis, cut from its fellow at the ſymphyſis.

C C Crura of the corpora cavernoſa penis.

D Glutæus maximus

E Coccygæus, covering a part of the ſacro-iſchiatic ligaments.

F F Pyriformis.

G Levator ani.

H Obturator internus.

Arteries and Veins.

a Left common iliac artery.

b External iliac artery.

c Epigaſtric artery.

d Internal iliac artery.

e Obturator artery.

f Arteria glutæa.

g Arteria pudenda, or pudica communis, ſweeping along to the arch of the pubes and corpora cavernoſa penis.

h Common iliac vein.

i External iliac vein.

Nerves.

1 Obturator or poſterior crural.

2 2 Part of the ſacral plexus, that ſends off the iſchiatic nerve.

3 3 Branches running to the penis, &c.

FIG. II.

A View of the Perinæal Parts----by CAMPER.

A The anus.

B B The penis.

C C Glutæi muſcles.

D D Sphinctor ani.

E E Levator ani.

F F Erectores covering the crura of the corpora cavernoſa.

G G Tranſverſalis perinæi.

H H, &c. Ejaculatores covering the bulb of the urethra.

Artery, Vein, and Nerves.

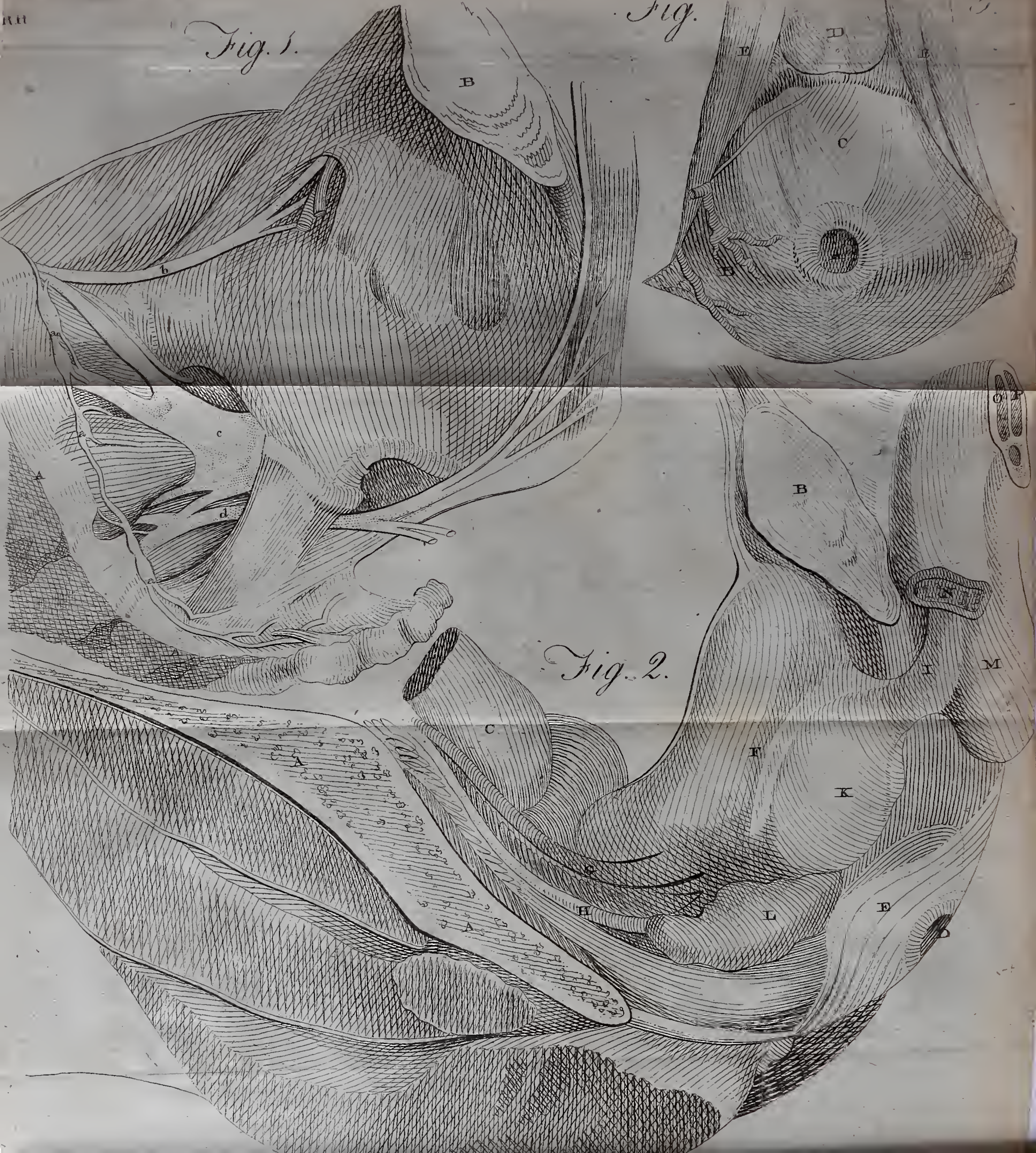
a Arteria pudica.

b Vena pudica.

c c Nerves going to the penis.

Fig. 1.

Fig. 2.



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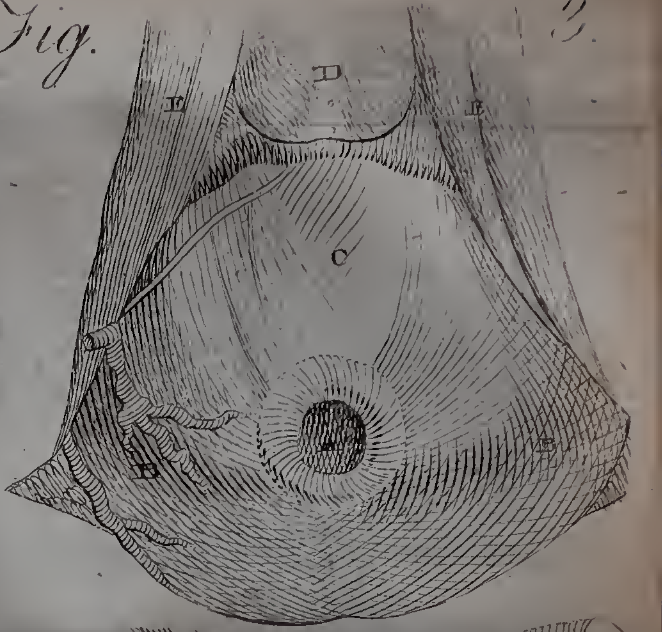

TABLE RR.

FIG. I.

A View of a vertical Section of the Pelvis---a by CAMPER.

A A Section of the os ſacrum and coccygis.

B A ſection of the ſymphyſis pubis.

a a a Inferior part of the intercoſtal nerve.

b Poſterior crural or obturator nerve.

c Iſchiatic nerve, formed by the ſacral plexus, going out by the iſchiatic notch above the ſacro-iſchiatic ligaments.

d Nerve running forward to the penis, &c.

FIG. II.

A View of a vertical Section of the Pelvis---a by CAMPER.

A A Section of the os innominatum.

B A ſection of the ſymphyſis pubis.

C Upper part of the rectum in the concavity formed by the os ſacrum and os coccygis.

D The anus.

E Sphincter ani.

F Body of the bladder of urine, in a flaccid ſtate.

G The ureter.

H Vas deferens.

L Veſicula ſeminalis.

K Proſtate gland, partly covered by the levator ani.

I Membranous part of the urethra, lying under the arch of the pubes.

M A ſection of the crus of the right corpus cavernoſum, cut off from the os pubis.

N A ſection of the ſame corpus cavernoſum above the ſcrotum.

O A ſection of the left one.

P A ſection of the urethra.

FIG. III.

A View of the Anus and Perinæum--------by CAMPER.

A The anus.

B B Levator ani.

C Proſtate gland.

D Bulb of the urethra.

E E Crura of the corpora cavernoſa, and the erectores.

TABLE SS.

Three Views of the Spinal Marrow--------by HALLER.

FIG. I.

A View of the Spinal Marrow, covered by its Membranes.

A Upper point, by which it joins with the cauda of the medulla oblongata.

The forty pair of ſpinal nerves are ſeen going off on each ſide, alſo covered by their membranes.

FIG. II.

A View of the Spinal Marrow from which the Dura Mater is diſſected off, and pinned back.

A Upper part of the ſpinal marrow.

B The termination of it in what is called cauda equina.

FIG. III.

A View of the Spinal Marrow, and the Manner in which it is ſupplied with Blood; the Spine being cut open laterally.

A Upper part of the ſpinal marrow.

B Under point, where the cauda equina begins.

D Trunk of the aorta.
E E Right carotid artery.
F F Right vertebral artery.
G G Deſcending aorta.

From theſe veſſels branches are repreſented going off and entering the ſpinal canal, by its lateral holes, and beautifully diſperſed on the ſpinal marrow, and anaſtomoſing with branches from above.

Fig. IV.

The inferior part of figure third.

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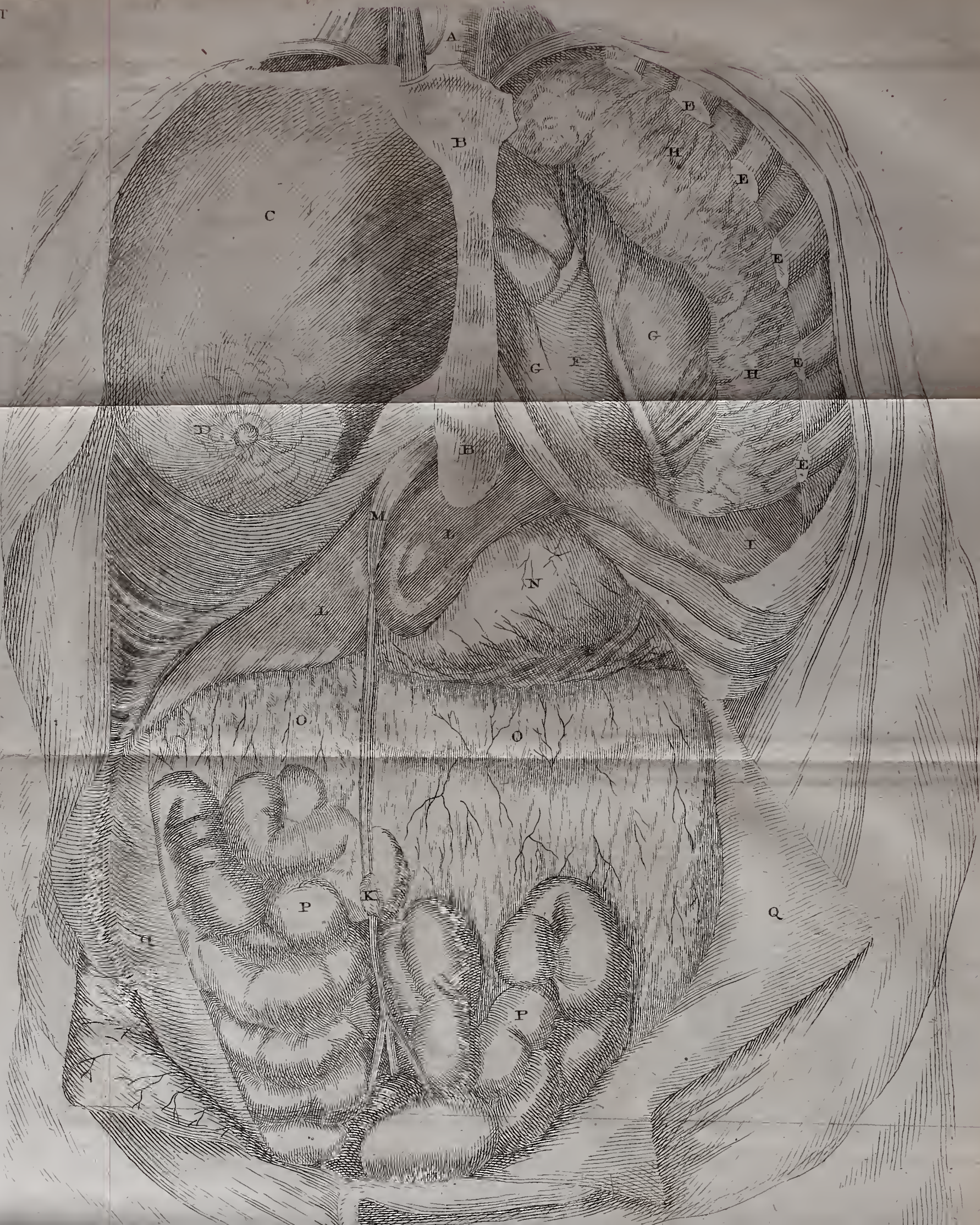

TABLE TT.

A Diſſection of the anterior Part of the Trunk ----by JENTY.

A Trachea arteria.

B B Sternum.

C Pectoralis major.

D The right mamma.

E E, &c. Cut extremities of the uppermoſt ribs of the left ſide.

F A part of the ſurface of the heart appearing through

G G The pericardium cut open.

H H Left lungs.

I Upper ſurface of the diaphragm.

K Umbilicus, to which the remains of the umbilical veſſels and urachus are ſeen connected.

L L The liver, divided into right and left lobes by

M The ſuſpenſory ligament.

N The ſtomach.

O O The great omentum, through which the arch of the colon is apparent.

P P Convolutions of the inteſtines.

Q Q Peritonæum and abdominal muſcles folded back.

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Fig. 1.

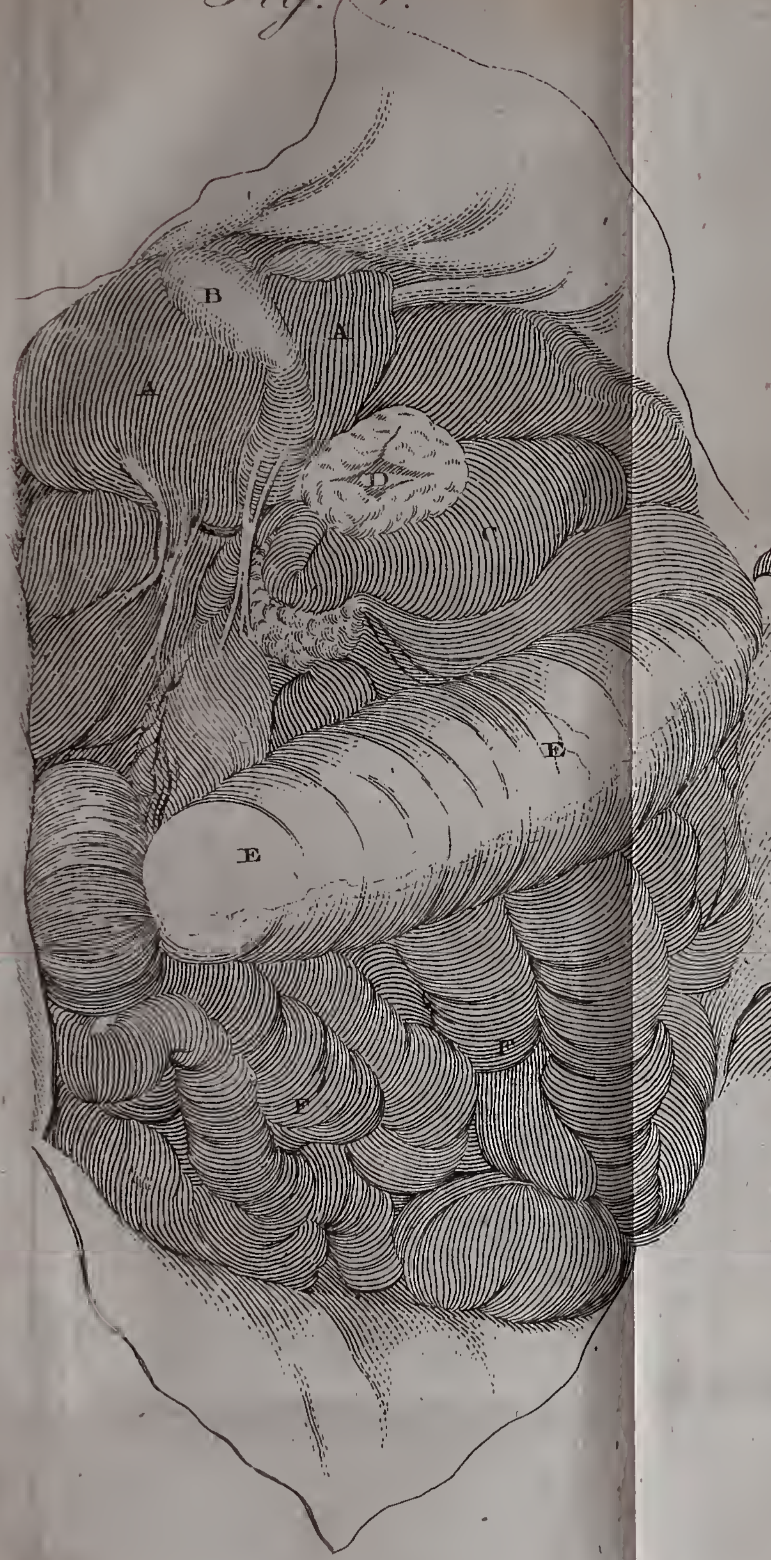


Fig. 2.

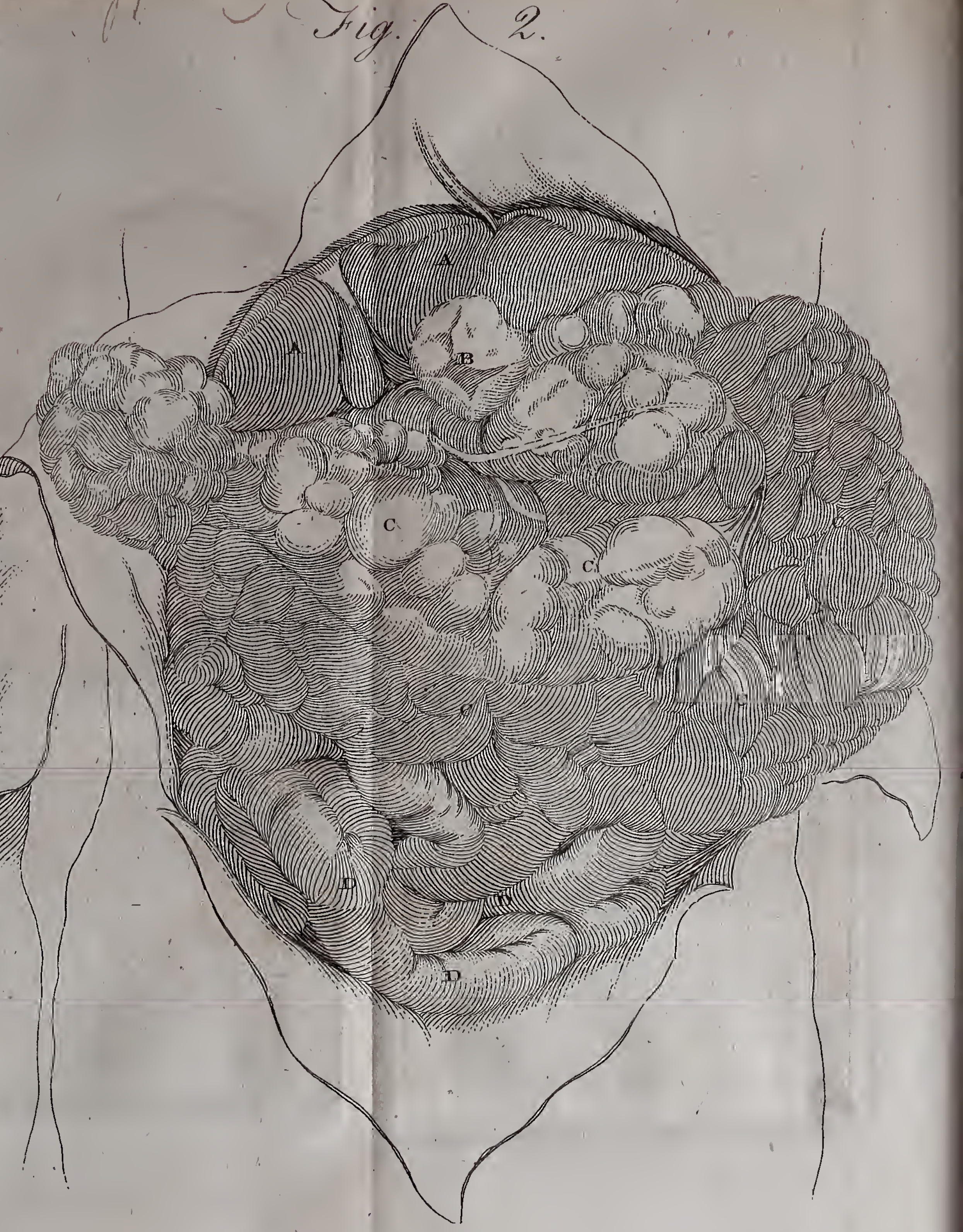


TABLE UU.

Two Views of the Abdominal Parts-------by HALLER.

FIG. I.

A A The liver turned upwards.
B Gall-bladder and biliary ducts.
C The ſtomach.
D Little omentum inflated.
E E Arch of the colon inflated.
F F Convolutions of the ſmall inteſtine.

FIG. II.

A A Liver turned upwards.
B Small omentum inflated.
C C C Great omentum inflated.
D D D Convolutions of the ſmall inteſtine.

TABLE VV.

A View of the Liver, Stomach, &c. the former a little drawn upwards.

The Liver.

A Concave or under ſurface of the right or great lobe.

B A ſmall part of its convexity, or upper ſurface.

C Concave or under ſurface of the left, or ſmall lobe.

D A portion of the ſuſpenſory ligament, remaining in the notch, and ſinking into its canal; the cord-like part of this was umbilical vein.

E The gall-bladder, partly lodged in a peculiar foſſa in the great lobe.

F Cyſtic duct.

G G G G The ſinus, or tranſverſe ſciſſure, common to both lobes, called ſinus portarum.

H Hepatic duct emerging from the ſinus portarum, and ending in the cyſtic one.

I The ductus communis choledochus, or cyſtic and hepatic ducts conjoined, running downwards to the duodenum.

K Trunk of the hepatic artery, a branch of the cœliac one dividing into two or three branches, and entering the liver by the ſinus portarum.

L Trunk of the vena portarum, dividing and entering the ſinus portarum, on its way from the inteſtines.

Stomach.

a a a Small arch or curvature, correſponding to the ſpine.

b b b Great arch or curvature, inclining forwards.

c c Little omentum, occupying the ſmall curvature.

d The point of the lobulus SPIGELLII, a ſmall proceſs of the liver, appearing through the little omentum.

e e e The coronary veſſels, ſweeping along the ſmall arch, and ſending off numerous branches.

f f f The coronary veſſels, running on the great omentum, near the great curvature, and likewiſe ſending off many branches that ſurround the ſtomach, and anaſtomoſe with the former.

g g g Upper part of the great omentum, depending from the ſtomach.

h Great or left extremity that lies in the left hypochondrium.

i Small or right extremity, that, together with the great lobe of the liver, occupy the right hypochondrium.

k Upper or cardiac orifice, cut from the oeſophagus, immediately below the diaphragm.

l The under or pyloric orifice, with a ſmall portion of the duodenum ſurrounding it. The pylorus nearly fills it up.

m Edge of the ſpleen that lies between the great extremity of the ſtomach and the ribs.

TABLE WW.

A View of the Liver, Spleen, Pancreas, and Duodenum, from below, after the Stomach is removed, and the anterior edge of the Liver drawn a little upwards.

The Liver.

A Concavity of the great lobe.

B Convexity of the ſmall lobe.

C Lobulus SPIGELLII.

D Notch in the poſterior or thick edge, that correſponds to the ſpine.

E E E Sinus portarum, or ſciſſure by which the veſſels are tranſmitted.

F Gall bladder.

G Cyſtic duct.

H Hepatic duct ariſing from the ſinus by two branches.

I Ductus communis choledochus.

K K K Hepatic artery, a branch of the cœliac.

L L L L Trunk of the vena portarum, entering the ſinus in two branches.

Spleen.

A A A The concave ſurface that correſponds to the great extremity of the ſtomach, with its ſciſſure or ſinus. tranſmitting veſſels.

The convex ſurface is turned to the diaphragm and ribs.

Pancreas.

A A A The great pancreas, and that ſurface which is ſeen from the omental cavity. The one end is attached to the ſpleen, and the other to the duodenum.

The dotted lines repreſent the excreting duct running longitudinally, and receiving numerous lateral branches, and enlarging as it approaches the duodenum, into which it opens, along with, or near to the biliary duct.

B The little pancreas; the dotted lines ſhew the manner and courſe of its duct.

Duodenum.

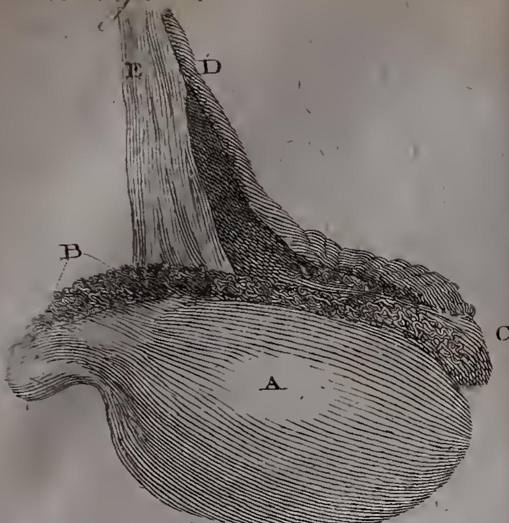
A The pylorus, ſurrounded with a ſmall ſhare of the adjacent ſubſtance of the ſtomach.

B Upper part of the duodenum, covered by the liver when in ſitu.

C The arch, or curvature, ſlit open to ſhew the valves or rugæ, and the common orifice of the biliary and pancreatic ducts.

D The duodenum, tending to the left ſide, acroſs the ſpine, where it is concealed by the laminæ of the meſocolon, as in a ſheath.

Fig. 1.



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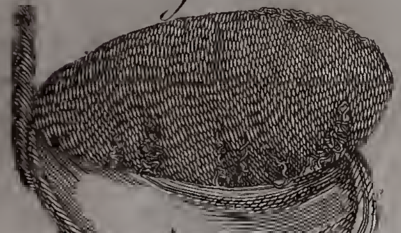

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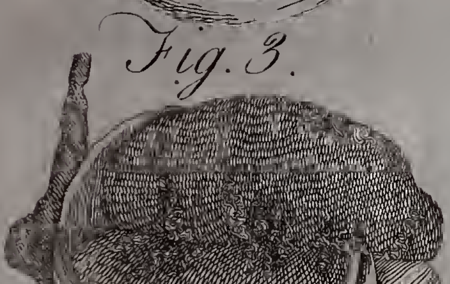

Fig. 4.

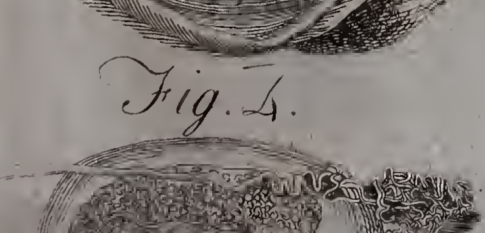

Fig. 8.

Fig. 5.

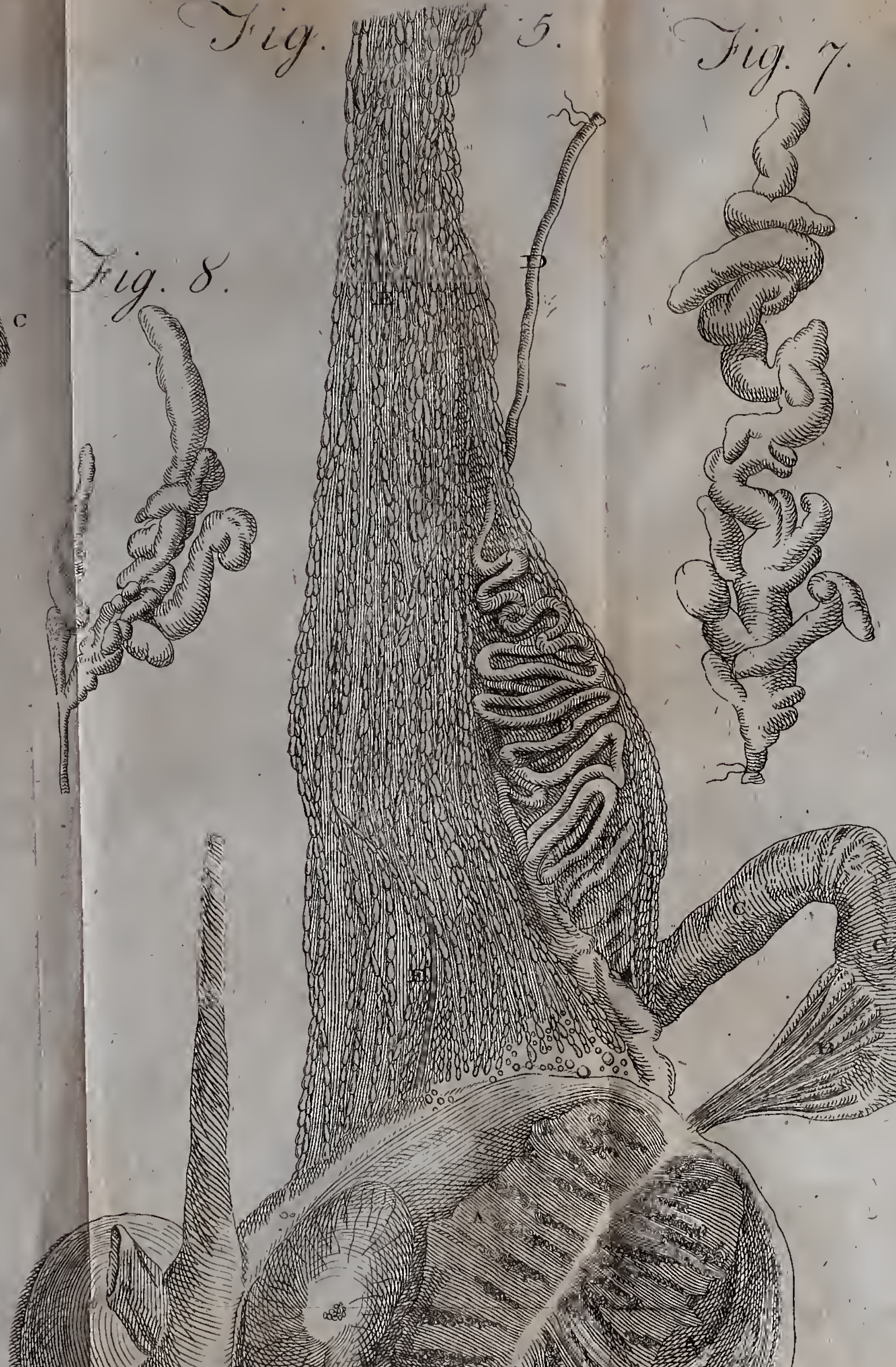

Fig. 7.

Fig. 6.

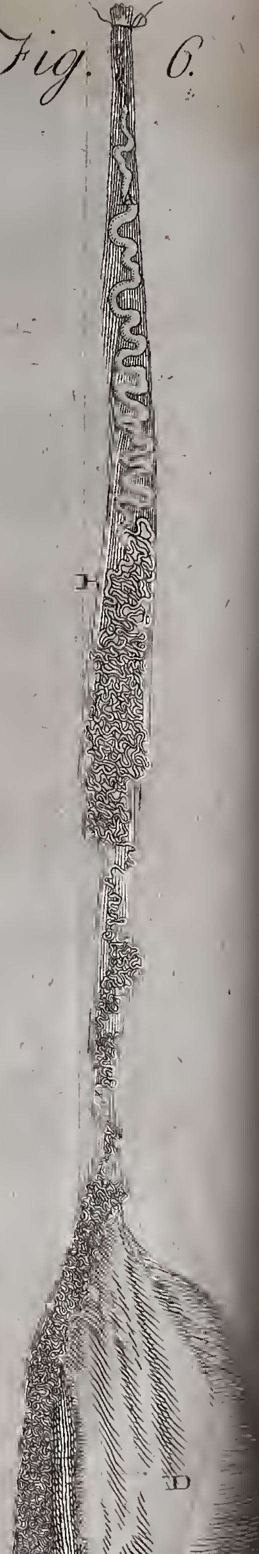

TABLE XX.

Various views of the Teſticle.

FIG. I.

A The body of the teſticle, covered by the tunica adnata or propria; the tunica vaginalis being entirely removed.

B Beginnings of the epididymis, ſometimes called, caput epididymidis.

C The other extremity of the epididymis, where it is reflected upon itſelf, and goes on to produce

D The vas deferens, which joins

E The remainder of the ſpermatic cord.

FIG. II.

A The tunica adnata, drawn off from the body of the teſtis, ſtill, however, adhering to its dorſum, where ſome of the delicate convoluted ſeminal veſſels appear.

FIG. III.

The body of the teſticle ſomewhat opened, after the tunica adnata is ſeparated, to ſhew the manner in which the convoluted cones of ſeminal veſſels lie, and tend to its dorſum.

FIG. IV.

The Teſticle, ſo diſſected as to ſhew the Manner in which the ſeminal Cones produce

A The vaſa efferentia that conſtitute the caput epididyminis, and that, uniting into one tube, much convoluted, forms the reſt of the epididymis, that ends in vas deferens.

FIG. V.

A View of the Teſticle and Spermatic Veſſels, ſo opened and prepared as to ſhew, after the Body of the Teſticle is opened,

A A The ſeminal convoluted ducts, tending to the dorſum of the teſticle, to iſſue under the name of vaſa efferentia, B, that form the epididymis, C C, and the vas deferens, at firſt much convoluted, D D D.

E E Numerous lymphatic veſſels that ariſe in the body of the teſticle, and paſs beyond the epididymis, and aſcend along the ſpermatic cord.

FIG. VII.

A The vas deferens, ſeparated from the reſt of the veſſels in the ſpermatic cord, which gradually becomes ſmaller.

B Termination of the epididymis.

C Beginning of the epididymis, formed by the vaſa efferentia.

D Body of the teſticle covered by the tunica adnata.

FIG. VIII. and IX.

The Veſiculæ Seminales, with which the Vaſa Deferentia are connected, immediately at their opening into the Urethra.

TABLE

TABLE D.

FIG. I.

The Uterine Syſtem---by **HALLER.**

A A Ovaria, the left one enlarged.
B B The Fallopian tubes diſtended.
C C Fringed extremities of the tubes.
D D Body of the uterus cut open.
E E Uterine cavity.
F Os internum.
G G Ligamenta lata.
H H Vagina cut open on its poſterior ſide.
I Urethra.
K Clitoris.
L L Nymphæ.
M M Labia.

FIG. II.

A view of the Os Internum, and part of the Vagina.

A The rima.
B B Vagina.

FIG. III.

A view of the Os Externum.

A A Labia.
B Clitoris.
C C Nymphæ.

C C Nymphæ.
D Hymen of a ſemilunar form.

FIG. IV.

A view of the Os Externum.

A A Labia.
B Clitoris.
C Urethra.
D D D Hymen of a circular form.

FIG. V.

A view of the Os Externum.

A A Labia.
B Clitoris.
C Urethra.
D Hymen, large and ſemilunar.

TABLE 2 D.

FIG. I.

A View of the Uterus of a Woman who died 36 Hours after Parturition, with its Arteries filled with Wax--by Dr. WALTER, ſen.

A A The uterine arteries ſtretching along the margins of the uterus, and mutually anaſtomoſing by numerous branches beautifully ſerpentine.

B B Internal ſpermatic arteries, anaſtomoſing largely with the uterine ones near the fundus uteri.

C C External ſpermatic arteries, or thoſe that run along the ligamenta rotunda, anaſtomoſing with the others.

FIG. II.

A View of the Uterus of a Woman that died 24 Hours after Parturition, with its Arteries and Veins filled with Wax, from which the Cellular Matter has been ſomewhat diſſected---by Dr. WALTER, ſenior.

A A The arteries moderately filled beautifully intermixing with the veins.

B B, &c. The veins, comparatively large, and exceedingly numerous and ſerpentine, with branches correſponding to the ſpermatic arteries external and internal.

TABLE DD.

FIG. I.

A view of the Uterus a few days gravid----by RUYSCH.

A A The body of the uterus cut open, ſo that its thickneſs and part of its cavity are ſeen.

B The os internum, or tranſverſe rima, between the protuberances, that from ſimilarity have occaſioned it to be called os tincæ.

C C The line to which the vagina adhered.

D D The ovaria, the left one cut open.

E A veſicle enlarged or impregnated, (ovum fœcundatum).

F Veſicles not enlarged (ovula non fœcundata).

G Blood-veſſels running in the cellular or common texture.

H Prominences cauſed by the contained veſicles, or ova.

I I The ligaments of the ovaria.

K K The Fallopian tubes, ſlit open near their fimbriated extremities.

L L Parts of the ligamenta lata uteri.

M M Parts of the ligamenta rotunda uteri.

FIG. II.

A view of a Uterus, taken from a woman who was killed a few hours after coition---- by RUYSCH.

The cavity of the uterus, and its tubes, were diſcovered filled with the male ſemenal fluid.

A The ſemen in the uterine cavity.

B The ſame matter appearing at the os internum.

TABLE DDD.

A view of the Uterine Syſtem, in conſequence of a tranſverſe and lateral ſection of the Pelvis----by SMELLIE.

A A The ovaria.

B B The Fallopian tubes; the fimbriated extremity of the left one is applied to the correſponding ovarium, while that of the right one is turned forward to ſhew its orifice.

C The uterus, its fundus or bottom.

D Its corpus, or body,

E Its cervix, or contracted portion.

e e e e The ſpace from which the cervix of the bladder has been cut off.

F The os internum.

The dotted lines ſhew the form, extent, and ſituation of the uterine cavity.

G G The ligamenta lata.

H H The ligamenta rotunda.

I I The vagina, cut open.

K K The ſuperior part of the rectum.

L The inferior part.

M The laſt lumbar vertebra.

N N The oſſa innominata at the place of diſſection.

O O Cellular ſubſtance between the integuments and muſcles.

P P The integuments of the nates.

Q The region of the os coccygis.

TABLE DDDD.

FIG. I.

A view of the Gravid Uterus, in ſitu, in the fourth or fifth month, cut vertically and tranſverſely----by SMELLIE.

A A The oſſa innominata cut as repreſented in the former plate.

B B B B The poſterior ſegment of the uterus, containing numerous veſſels.

C The fœtus, with its vertex preſented, or downwards.

E E Accidental flexions of the umbilical chord.

F The placenta, its concave ſurface covered by the chorion and amnios.

G G The membranes adhering to the uterus, from which the light waved lines, g g g g, repreſent their edges as ſomewhat detached.

H The cervix uteri ſhortened, from which the bladder has been diſſected.

I The os internum.

K The ligamenta lata.

L L The vagina cut open on the fore part.

M M Cellular ſubſtance.

N N The integuments of the nates.

O The anus.

FIG. II.

A view of the gravid Uterus in the ſecond month, cut vertically and tranſverſely ; in which the Placenta and membranes are diſtinctly ſeen----by SMELLIE.

The cervix uteri is not ſhortened.

FIG. III.

A view of the gravid Uterus in the ſecond month, cut vertically and tranſverſely.---- The fœtus and its parts are more evolved than in the former figure----by SMELLIE.

The cervix uteri is conſiderably ſhortened.

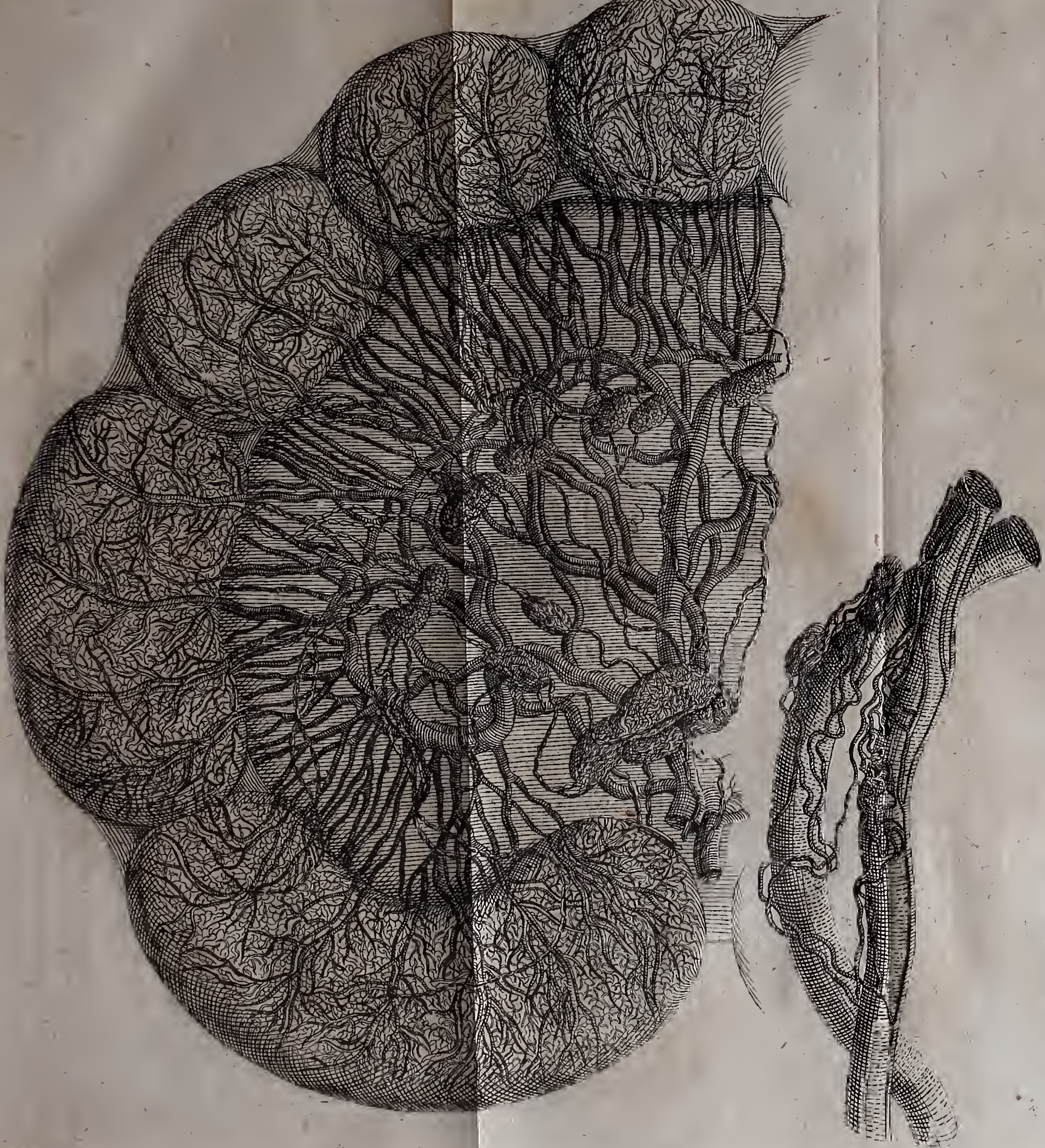

TABLE FF.

FIG. I.

A View of the Veſſels that form the Umbilical Chord, &c.---by BIDLOO.

A The umbilical ring or opening in the tendons of the abdominal muſcles, about the middle of the linea alba.

B Part of the umbilical chord, drawn upwards, and tied by a thread to a nail.

C C The convex ſurface of the liver.

D D The inteſtines convoluted.

E The bladder of urine.

F F The internal iliac or hypogaſtric arteries, reflected on each ſide of the bladder, and running to the umbilical ring, to become umbilical arteries. They lie without the peritonæum.

G The umbilical vein, in its courſe from the umbilicus to the notch and canal of the liver, and to the ſinus venæ portarum, from which the canalis venoſus runs backwards to the vena cava. This is entirely without the peritonæum, and partly involved in the duplicature of it, which is called the broad or ſuſpenſory ligament of the liver, that divides the lobes.

H The urachus, extended from the fundus of the bladder to the umbilicus, between the two arteries.

FIG. II.

A View of the Heart of the Fœtus, diſſected ſo as to ſhew,

A The ſeptum, or partition of the auricles.

B The foramen ovale, with its valve nearly filling it.

FINIS.